



PACKAGING CATALOG

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FOREWORD

THIS year, in view of world conditions, it was unthinkable to approach the annual task of preparing the CATALOG as though packaging were as usual. The abnormal situation has demanded an entirely different treatment, because—for one thing—almost without exception all of the materials of packaging have been for months under the strictest kind of governmental control.

Naturally, the project required the gathering of an immense quantity of new editorial matter as well as drastic revisions of much of the text which has dealt with standard practices.

Some of the new text matter, even though its usefulness may be only temporary, is imperatively necessary now—as for instance—information about war orders limiting uses of accustomed materials. In this single reference work, therefore, will be found regulations and specifications covering packages of metal, glass and paper, as well as shipping containers of wood, corrugated and fibreboard.

Other new matter in the book will prove of permanent value, particularly the discussions of standardized practices in shipping, types of glass containers, new methods of heat sealing, new kinds of protective coatings and new forms of laminations. In these respects the book is a chronicle of progress as well as a working manual for today's needs. Its chief value, we believe, will consist in helping its readers to adapt themselves to the most chaotic period in all history.

Reluctantly, we have omitted many of the discussions of the beautiful in packaging which have proved so helpful in happier times. The reason is obvious: Wartime design is functional. External appeal is secondary to protection. In an economy of terrifying scarcity, producers have little need to think of sales appeal and package beauty. They must concentrate on making available goods go around and on packages that protect and conserve. When peace comes, package beauty will return, and future editions of the book will give it ample space.

Always a helpful feature in presenting facts about materials, equipment and services, the advertisements in this edition of PACKAGING CATALOG sound a new note of helpfulness. Some of them express justifiable pride in direct war effort; others tell of alternate materials that have been developed; still others give new "know-how" information and suggest ways of making equipment last longer.

While the war lasts, this book, we believe, will serve as a manual and a guide to help makers and users of packages adjust themselves to a world out of joint. When the war is over, it will help to utilize the lessons of war to serve the new needs of peace. More than that, it will stand as an enduring record of the contributions that have been made to the war effort by those in the packaging field.

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PACKAGING CATALOG represents the composite thoughts and ideas of many of the individuals and firms in the packaging field. We have zealously endeavored to give personal credit to each of those who have helped us make this work possible. To these "good neighbors" and to the hundreds who have assisted them, we extend our sincere thanks for their work. They can feel proud of PACKAGING CATALOG, 1943—the wartime issue.

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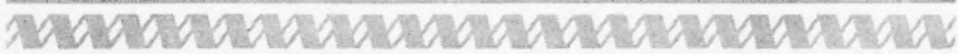
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Military Packaging

by Frederick S. Leinbach

AS IS well known, the term "Packaging," in the parlance of military specifications, refers to the primary container of a product rather than to its shipping container. The latter is referred to as its "Packing." Thus, the can that holds the tomatoes is the Package, the box that carries the cans is the Packing. In some instances the primary container serves also as the shipping container and the differentiation does not apply so clearly. An example of this is in the cloth-multiwall paper bag combination that has so successfully shipped dry granular subsistence items, for although the technical differentiation still obtains, the two parts of the container (discussed later on) are so closely interrelated that they are handled as one problem.

The year 1942 will stand out in the history of the science of packaging. Desperate war-born incentive to progress reached through and through the field. During preceding years, materials, their combinations, and forms of packages were attributed with almost any quality that could be thought up, to make them appear desirable to the purchaser. Many of these were useful, many were desirable, some may have been drawn from rather difficult and obscure reasoning. Packaging was done for convenience, for beauty or attractiveness, for protection, for specialized marketing or sometimes just because everyone else was packaging. But War placed the same immutable requirement on the package that it placed on the plane, the gun, the tank, the soldier—simply: *it had to be adequate*. All the special attributes in the world, all the effort of design, marketing, or widespread use meant little. The package either carried the contents safely to the destination or it didn't. Failure would be as tragic as the failure of any military resource.

The earliest military movements of the war threw the fundamentally sound and the fundamentally unsound into sharp relief. As new theaters of war opened, changing technique of supply brought new requirements to packaging. Added to the problem of adequacy was that of availability in huge quantities—availability of material, fabricating equipment and use facilities. An unusual material or technique, though thoroughly adequate, even superior, may not always have found widespread use because the necessary facilities were not procurable. A further obligation fell upon those responsible for Military Packaging Specifications because, however optimistic the experimental results may have been, there were always questions of unknown weaknesses that would come to light only through shipping experience.

Accordingly, in March 1942 through the joined efforts of the War Production Board, the Army, the Navy and the then Federal Surplus Commodities Administration (now the Food Distribution Administration) these agencies met with a large and representative group of package and package material suppliers in Washington. The suppliers formed groups with common interests and techniques. Each group was given a list of commodities, and from this list (then containing only subsistence items) each group picked those for which they felt they could offer an *adequate and available* container. These recommendations were grouped and studied by a Packaging Committee having representatives from the WPB Army, Navy and FSCC. From the complete lists, those packages were chosen which the Committee and its advisers believed best combined the two basic requirements of adequacy and availability.

In subsistence items most processed foods, of course,



Officers of the Quartermaster Corps "taste-testing" army foods. The Army's food supply is main problem of the Corps. Containers must meet rigid performance requirements. Photo U. S. Army Signal Corps.

are carried in tinplate. Glass has been limited to those items incapable of storage otherwise, for the nature of that very useful packaging material required unusually large amounts of packing materials for safe carriage and storage under overseas shipping and combat conditions. It was felt that glass, which is giving, has given, and will give excellent results domestically, could best serve by releasing metal for overseas packaging.

The use of metal, for urgent conservation reasons, was limited to three types of commodities: Those requiring processing after closure, those requiring vacuum or gas packing and those (particularly some dehydrated foods) which had so low a level of humidity equilibria within their containers that they were believed to require the ultimate protection against moisture-vapor given by hermetically sealed, rigid metal containers.

Accordingly, there were chosen a series of constructions of paper sidewall fibre cans with metal ends and with graded qualities of greaseproofness and moisture-vaporproofness, but with excellent water-proofness wherever possible. These were specified for such items as baking powder, tea, spices, baking soda and the like, each item being placed in that construction having the protective qualities required. For most usage, the war procurement agencies involved felt that friction plugs could not be used safely without likelihood of opening during overseas shipment, hence most fibre cans are made with solid ends. Embossing of the metal, rather than semi-perforation, was chosen for marking "punch-outs," because of the better water-proofness and moisture-vaporproofness resulting. Deeper countersink, wider flange and heavier metal gauge dimensions than usual were required for greater strength and firmer joint between end and sidewall.

New designs adopted

For those commodities adaptable to packaging in bags (beans, peas, rice, flour, sugar and salt) the textile bag manufacturers and the paper shipping sack manufacturers pooled their abilities and developed a textile bag which, after filling and a sewn closure, was enclosed in a multiwall paper shipping sack of five plies, of which the second and fourth were asphalt laminated papers for water-proofness. A taped, sewn, wax-dipped closure was preferred, although at first it was necessary to allow a reverse folded, stapled closure. As quickly as possible this latter method has been minimized because in handling, these closures too often were used for gripping the package, and they were torn open. Originally, these packages generally held 100 lbs. Because of female labor in some lend-lease ports, and because 100 lbs. is a lot for one man to handle under combat supply conditions, the net weight in these bags has been increasingly held to 50 lbs. In those cases where an industry was not mechanically equipped to put up a 50-lb. pack, or where military organizational requirements called for a smaller package, six 10-lb. cloth bag packages have been baled in the multiwall paper outer bag.

The over-all advantages of the "cloth-in-paper" combination are many. The cloth bag alone has enough

strength to carry the contents. If snagged and torn, it has the advantage of easy, sure repair en route. The cloth from the empty bags also serves many useful purposes in the field. The multiwall paper bag adds a safety factor in strength, and lends the package water-proofness—a most necessary requirement in landing operations, particularly where inadequate or unusual port facilities exist. It makes storage possible in rainy, moist climates where warehousing is inadequate or, as so often is the case, non-existent. Some question has been raised as to the likelihood of beans, peas, etc. (dried seeds), mildewing in a moisture-resistant pack. Recently completed tests demonstrate conclusively that above a moisture content of 13 per cent these commodities are exceedingly susceptible to mildewing even when in a "breather" package (i.e., non-moisture-resistant) whereas below that moisture level these commodities, stored under mold-favorable conditions (95° F., 95 per cent R.H.), without exception avoided loss through mildewing in the specified moisture-resistant package but mildewed beyond use when stored in "breather" packages. In addition to the multiwall paper outer bag, an exceedingly strong and water-proof laminated paper-fabric outer bag has been developed for special requirements.

Macaroni, spaghetti, etc., have been packaged without excessive moisture-vaporproofness, with good water-proof protection and strength of package. This has been accomplished by having the product placed in a corrugated fibre box lined with a kraft bag having a cellophane or a laminated glassine liner. After multiple-fold closure of the bag, this box is enclosed in an asphalt laminated or asphalt impregnated paper having water-proof seams and seals.

Packing dried foods

Dehydrated foods fall into three classes—those requiring vacuum or gas packing, combined in some instances with extreme moisture-vaporproofness, those requiring extreme moisture-vaporproofness and those not requiring so high a level of moisture-vaporproofness. The first type, including dehydrated carrots, cabbage, whole milk and meats, and the second type, including dehydrated cranberry flakes, tomato juice cocktail, onions and skim milk, were considered as requiring the protection of hermetically sealed rigid metal containers. Those in the third group, including dehydrated white potatoes, sweet potatoes, beets, rutabagas, various soups and eggs, were not allowed use of such critical materials.

Packaging for dried whole eggs for lend-lease is now based upon an extensive test, and is aimed towards use of as much variation of facility and material as is available in the plants of those whose types of package were considered acceptable in test. Packaging of the remainder of this group currently calls for a complex foil lamination of considerable water-proofness and strength and capable of quite low moisture-vapor transmission rates. One of the difficulties in designing this package lay in the extreme hardness and sharpness of most of the vegetables. Added to the fact that the specified 1,200 cubic inch volume of these products weigh anywhere from 12 to

18 lbs., is the fact that sharpness and abrasiveness of product meant the provision of some means of protecting the moisture barrier from the product. Such protection, it was determined, could be provided by an inner carton, which, when filled, closed and heat-sealed within the laminated foil barrier, is placed within an outer solid fibre carton. Two of these packages are placed in a rigid shipping container. So abrasive is the product that if the inner carton is not sealed absolutely siftproof, and if the "fines" sift out between the inner carton and the moisture barrier, they will cut their way through the barrier under the vibration of shipping. In this third group package, insect-proofness depends largely upon the theory that if the outside of the package has no particles of the food upon it, and if the barrier is thoroughly sealed, there will be no food odors to attract insects, therefore no attack.

Specifications for frozen vegetable packages largely follow the general form of present institutional packages, with the exception of insistence upon a liner where, in a few instances, only an interleaving may have been used. In some instances, an increased strength was called for in that liner. In other cases, carton board quality and weight have been increased.

Emergency ration pack

One of the most shining examples of military packaging and its problems is to be found in the emergency rations of the Army and Navy. Called upon to furnish tremendous quantities of newly devised rations upon short notice, the Quartermaster Corps of the Army had to try to tread that narrow line mentioned above, that is, the avoidance of overconfidence in both domestic experience and favorable experimental results. They were faced, too, with the question of available facilities for large-scale production. Under the circumstances it was inevitable that the specifications should remain somewhat fluid, that extension of use of the rations into new types of operations should bring new requirements, or that flaws be found which were impossible to anticipate in

Army subsistence depots check constantly on quality of food supplies and on serviceability of packages.



formerly specified materials. The packaging record of the Q.M.C. has been excellent, particularly when it is realized that in so rapidly expanding a war, no one can know all of the rigors a package will have to withstand. Their work has proceeded with a startlingly low use of critical material, when compared to similar assemblies in use by the other military organizations of the world.

The Navy emergency rations share as much as possible the Army's experience, but naturally must remain in a series of metal containers because of their constant exposure to sea air.

Medical supplies have been considered as requiring the best protection by the sheer weight of their importance. Beyond that, it is obvious that even though a chemical may not be particularly hygroscopic or likely to oxidative change, its package still should be capable of long-term and firm reclosure because very often only a small part of the contents may be used at any given time. Combat items, if issued to the individual soldier, have had to be packaged for water-proofness, but without too difficult an opening problem for a wounded man. If for use in field equipment, the assembly has had to have superior water-proofness along with all the other requisites of protection. Collapsible tubes have commanded the use of block tin, although considerable experimental work has been done with lead tubes carrying an interior coating, and with plastic and other non-metallic replacement materials. Obviously glass has found more widespread need in this than in any other military packaging field. Wherever used, its kind, shape and finish are as close as possible to the agreed standardizations.

Dry-packing machinery

One of the newer types of packaging that has developed, mainly as a result of the war, has been the technique of preserving machined parts and assemblies during overseas shipment and long-term storage. This packaging, as is well known, falls into two types. The first is for use on spare parts, generally those which are sent to established bases and which, by their nature, will not be harmed by heavy, more or less hard corrosion-resistant coating materials. The finished parts are thoroughly coated with one of the various wax-like corrosion-resistant compounds available, and then are covered with a wrapping that is carefully made to be chemically neutral. The technique is very similar to that used for a long time in the machinery business, but the efficiency of the materials is much increased and their range widely broadened. The technique itself has been amplified to the point of furnishing good water-proof packaging. The second type of packaging for machined parts is for application to assemblies or to parts which by their nature will be harmed by the compounds necessarily used under the first type of packaging.

After the assemblies, even including entire airplane engines, are set up and given final adjustment, they are given only those corrosion-preventing compounds which will be light enough to act as lubricants. These latter, of course, do not happen to be sufficiently corrosion-resistant to protect the engine through long shipment

and storage, yet heavier compounds designed to do so not only are not lubricants, but would require disassembly of the delicately adjusted mechanism for removal before use at destination, with subsequent reassembly and adjustment. It has been determined that so far as atmospheric corrosion is concerned, its effect is minimized below a relative humidity of about 30 per cent. Therefore, under this type of packaging the adjusted, lubricated assembly is placed within a sealed moisture-vaporproof barrier, and the interior of the package, as well as all interior spaces within the assembly, are kept below about 20 per cent R.H. through a dehydrating agent placed within the barrier. Since the moisture barriers will transmit even slight amounts of moisture-vapor, and since shipment may be difficult and storage sometimes necessarily long, the desiccant eventually may be called upon to absorb its limit capacity of moisture and the interior relative humidity may thereby go above the safe limit. By means of an ingenious color indicator which changes color as the upper limit of safe humidity is approached, and by assuring transparency of at least part of the package so that the indicator, left in the interior, may be viewed clearly, it has been found possible to determine the time when recharging the desiccants is necessary to hold the interior humidity below the safe limits.

Contrary to some popular opinion, military packaging, in the main, has been accomplished with the use of as

few critical materials as could be considered compatible with the stringent requirements placed on the packages.

"It must be in usable shape"

However, it should be realized that the ideal form of conservation in military packaging lies in delivery of commodities in usable condition with the most efficient possible use of whatever materials—critical or otherwise—are needed to make that delivery. Besides this, it is becoming apparent that there is rapidly approaching the time when there will be no such thing as a "non-critical" packaging material. The question becomes that of determining which material most efficiently performs the job at hand, and for which jobs certain materials must be reserved because *they* alone can fill the requirements. To this end a basic change in policy in military packaging recently has begun to develop. This new policy does not require, as did the old, that *all* packages must be capable of withstanding the rigorous and hazardous handling which only the minority will receive, but, rather, it calls for use of the strongest and most protective materials in those packages directed to difficult and hazardous tasks, while other materials may be used on packages expected to be handled in a manner to which they are better adapted. To implement so sensible and far-reaching a policy, however, requires painstaking planning and careful and troublesome direction and distribution.

Packaging in a Seller's Market

by Standish C. Marsh

THE merchandising, marketing and packaging picture has been changing so fast that it has almost become a blur. New methods in manufacturing, packaging and distribution have resulted from shortages of raw materials, equipment, packages, transportation facilities, modified selling techniques and rationing.

These changes, combined with other influences such as the lack of retail salespeople and new consumer-buying habits, have altered many old concepts of merchandising.

Already there have been vast changes in the whole distribution picture. Thousands of retailers have been forced to close their doors. Other retailers and distributors in an effort to survive, have been forced to branch out into different fields and take on totally unrelated lines of goods. Incidentally, it is heartening to note that, seller's market or no seller's market, many sound-thinking, progressive manufacturers have been doing a real job of holding their dealer and distributor franchises not only intact but alive and virile.

On the retail front, probably the most important current merchandising trend is an increased swing to self-service. Acute shortage of retail salespeople, increasing costs resulting from inexperienced personnel, higher taxes and shrinking profit margins are all tending to

widen the adoption of self-service among all types of retailers. This trend, given its greatest impetus by large-volume super markets, has spread throughout the retail grocery field and is now getting a foothold in drug retailing and even with some department stores. Many authorities believe that self-service will continue and will become the cornerstone of all future retailing. If that happens, the package itself will have an even bigger job to do, but advertised, packaged brands should benefit materially, because they sell best under self-service retailing. I make this statement despite the recognized fact that self-service operation gives the retailer a certain degree of control over manufacturer's brands by leaving in his hands the power to select which brands receive the benefit of mass display, advantageous shelf position and other "breaks" at the point of sale.

At the same time, it should be remembered that consumers have become accustomed to self-service arrangements. Self-service is not the novelty it was a few years ago, and now that necessity has forced further expansion, we may expect greater consumer acceptance. Today's seller's market has also shown that while price, in many cases, may be a secondary factor, the consumer still demands a brand in which he has confidence. He knows

that advertised, packaged brands are backed by nationally known, long-established organizations. Substitution is rife, but consumers don't like it!

Because advertising is the primary source of information that women have about what they can buy, and where it can be obtained, it is significant that impartial surveys show that today advertising is being more widely and closely read by the American people than ever before. Alert advertisers and merchandisers seeking to maintain or improve their competitive position have not failed to take advantage of this opportunity despite wartime conditions and problems. Their post-war position will be much more favorable than competitors who have not given advertising and merchandising plans sufficient attention during the war period.

However, if and when self-service becomes the accepted thing in all fields of retailing, it is certain that American packagers will be ready to meet this opportunity. The 12th All-America Package Competition showed the world that in the face of a seller's market and a host of shortages and production difficulties, packagers had not forgotten the appearance of their packages or neglected merchandising considerations.

The British, to draw a parallel, due to lack of critical materials and curtailment of shipping space, have experienced far more drastic curbs and conditions than anything we have gone through. However, it is pretty well acknowledged that many British manufacturers,

faced with compulsory changes in packages, forgot all about design and package appearance. The result was a far greater number of drab, uninspired packages than was necessitated by the materials (or the lack of materials) situation. That these drab, uninteresting packages have made no contribution whatever to the morale of those on the British home front is, of course, obvious.

I believe it can be honestly said that American packagers are doing a brilliant job of keeping consumer goodwill as well as sustaining home-front morale by developing and producing substitute packages which are practical and effective and still attractive. Packages are only little things in the scheme of living, but, after all, as a beverage association expressed it in a recent advertisement: "Morale is a lot of little things!"

In the October 1942 *Modern Packaging*, Frank H. Meeks wrote an interesting account of the wartime display picture in which he stated: "American merchandising is not something that suddenly sprang up, only to disappear with the first challenge to its existence." I believe that, by and large, American manufacturers and advertisers have given ample evidence of this. Faced with a host of tremendously complex problems they are keeping alive and healthy their merchandising operations, their brand names and their packages. This, they know, is the best way to meet the competition of new brands and new conditions which will follow after the war.

Critical Materials Under Control

UNTIL the war cut off supplies of important materials, comparatively few people in the field realized how dependent packaging is on a world-wide economy. A stern course in commercial geography thrust upon us the knowledge that: tin came from the Straits Settlements; rubber from the Malay Peninsula and South America; certain types of pulp (particularly for British use) from Scandinavian countries. Resins and lacquers came from China; pigments for printing inks from many quarters of the globe; cordage came from the Philippines; casein for paper coating came from Argentina, and chalk for the same purpose came from the cliffs of Dover.

Even with our own rich resources of steel, aluminum, oils, resins and wood pulp, we were not sufficiently self-supporting to warrant an isolationist position.

The war upset all established commerce. Transportation suffered first; then sources of accustomed supply changed hands—with resulting shocks, dislocations and searches for substitute supplies. In many unpleasant ways the packaging world was forced to learn that its materials were identically the same as those commandeered by war. Steel, tin and aluminum, which had made the durable goods of packaging, were all needed to make the quickly destroyed machines of war. Paper and

pulp were required in unthought-of quantities to pack ammunitions and foods for soldiers and allies. Pigments and resins were requisitioned for protective coatings and camouflage—these were but a few of the discoveries which peaceful American business suddenly made.

But the packaging field has willingly and cheerfully adapted itself to the task of operating under government regulation for the duration of the war, in producing goods for the government as well as for civilian use.

Government regulation takes shape in controls of three different types: "P" Orders establish *priority* of use, or the order of precedence in which material shall be supplied to those who need it. "M" Orders designate *uses for materials* and prescribe conditions under which they may be used. "L" Orders *limit the uses* of materials and in many cases present *lists* of products *forbidden* to use a given substance.

For the convenience of the reader, a very complete chart is included in this chapter, consisting of an alphabetical list of packaging materials and subjects, and opposite each a list of the orders relating thereto, as those orders affect packaging practice. For complete information, the full order should be studied.



Packaging Materials Under Government Control

This check list, alphabetically arranged, shows the principal materials of packaging and the reference numbers of government orders affecting them. The orders themselves, very explicit and detailed, should be consulted for full particulars. This list is as of our press date. Packagers should also be on the lookout for subsequent orders.

PRODUCT	RESTRICTIVE ORDERS
ACETONE	M-148 General Exports Order
ACRYLIC MONOMER & ACRYLIC RESIN	M-260 General Preference Order
ADHESIVES (see "Resins")	
AGAVE FIBRE	M-63 General Imports Order
ALCOHOLS	M-84 General Preference Order
Butyl	M-159 General Preference Order
Capryl	M-167 General Preference Order
Ethyl alcohol and related compounds	M-30 General Preference Order
Hexahydric	M-270 General Preference Order
Isopropyl	M-168 General Preference Order
Methyl alcohol (Methanol)	M-31 General Preference Order
ALUMINUM	M-1 and Supp. General Preference Orders
Aluminum pigment and paint	M-1-g Supplementary Order
Scrap	M-1-d Supplementary Order
ANHYDRIDE, PHTHALIC	M-214 General Preference Order
ANTIMONY	M-112 General Preference Order
ASPHALT	M-63 General Imports Order
BAGS	
Agricultural	M-107 General Preference Order
Cotton fabric production	L-99 Limitation Order
Cotton textiles for bags	M-107 General Preference Order
Grocers' bags	L-261 Limitation Order
Resale of bag osnaburg & bag sheeting	M-107 General Preference Order
Osnaburgs	P-116 Preference Rating Order
Textile & paper shipping bags	M-221 Conservation Order
BARRELS (see "Steel Drums")	
BARREL HOOPS	
Copper	M-9-c Conservation Order
Iron and steel	M-126 Conservation Order
BENZENE	M-137 Conservation Order
BEVERAGE BOTTLE CASES (iron & steel)	M-126 Conservation Order
BEVERAGE BOTTLING MACHINERY	L-83 Industrial Machinery, General Limitation Order
BOTTLES	
Glass Container & Closure Simplification	L-103 Limitation Order
BOXES	
Corrugated and fibre	M-113 General Inventory Order
Folding and set-up	L-239 Limitation Order
Steel stitching wire	M-21 General Preference Order
BRONZE	
Powder and products	M-9 and Supplementary Orders
BURLAP	M-47 Conservation Order
CADDIES	L-239 Limitation Order
CANNED GOODS	
Cans	M-81 Conservation Order
Canned & Processed foods	M-86 and Supp. General Conservation Orders
CANNERIES	
ables and fish-canning plant	

Glass Container & Closure Simplification	L-103 Limitation Order	METAL SIGNS	L-29 Limitation Order
BOXES		NAPHTHALENE	M-105 Conservation Order
Corrugated and fibre	M-113 General Inventory Order	NAPHTHENIC ACID AND NAPHTHENATES	M-142 General Preference Order
Folding and set-up	L-239 Limitation Order	NITROCELLULOSE, SOLUBLE	M-154 General Preference Order
Steel stitching wire	M-21 General Preference Order	OSNABURGS (see "Bags")	
BRONZE		PACKAGING & LABELING MACHINERY	L-83 Limitation Order
Powder and products	M-9 and Supplementary Orders	PAINTS & PIGMENTS	
BURLAP	M-47 Conservation Order	Aluminum	M-1-g Supp. General Preference Order
CADDIES	L-239 Limitation Order	Antimony	M-112 General Preference Order
CANNED GOODS		Bronze	M-9-c-3 Supp. Conservation Order
Cans	M-81 Conservation Order	Chromium	M-18-a General Preference Order
Canned & Processed foods	M-86 and Supp. General Conservation Orders	Cobalt	M-39 and Supp. General Preference Orders
CANNERIES		Copper	M-9 and Supp. General Preference Orders
Fruits, vegetables and fish canning plant	P-115 Preference Rating Order	Mercury	M-78 General Preference Order
maintenance and expansion	P-115 Preference Rating Order	Natural Resins	M-56 General Preference Order
Users of hermetically sealed containers		Zinc sulphide pigments	M-128 General Preference Order
may operate under		PAPER AND PAPER PRODUCTS	
CANS		Cellophane	L-20 Limitation Order
	M-136 Conservation Order	Paper and paper board	M-241 & Supp. General Preference Orders
	M-126 Conservation Order	Standardization and simplification	L-120 Limitation Order
	M-81 General Preference Order	PAPER MANUFACTURE	
	M-241 & M-241-a General Preference Orders	Chlorine	L-11 Limitation Order
CARDBOARD		Chromium	M-18 General Preference Order
CARTONS	L-239 Limitation Order	Copper	M-9-a Conservation Order
CASEIN	M-63 General Imports Order	Tungsten	M-29-b Conservation Order
CELLOPHANE	L-20 Limitation Order	PHENOLIC RESINS	M-246 General Preference Order
CHEMICALS		PHTHALATE PLASTICIZERS	M-203 General Preference Order
(see specific chemical concerned)	M-227 General Preference Order	PHTHALIC ALKYD RESINS	M-139 General Preference Order
Distribution of copper chemicals		PHTHALIC ANHYDRIDE	M-214 General Preference Order
CHLORINATED HYDROCARBON		PIGMENTS (see "Paints & Pigments")	
SOLVENTS		PLASTICS	
CHLORINATED PARAFFIN		(see "Formaldehyde")	
CHLORINE & CHLORINE PRODUCTS		(see "Phenolic Resins")	
		(see "Cellophane")	
		(see "Ethyl Cellulose")	
CHROMIUM		POLYVINYL BUTYRAL	M-10 General Preference Order
CLOSURES		POLYVINYL CHLORIDE	M-10 General Preference Order
Formaldehyde		PRINTING & PUBLISHING MACHINERY	L-83 Limitation Order
Glass		Copper and bronze	M-9-c-3 Supp. Conservation Order
For glass containers		Parts and supplies	L-226 Limitation Order
Tinplate and terneplate		Rubber equipment	M-15 and Supp. Gen. Preference Order
COATINGS		PRINTING INK (see "Paints & Pigments")	
(see "Formaldehyde")		PULP (see "Paper Manufacture")	
(see "Phenolic resins")			
(see "Paints & Pigments")			
(see "Resins")			
COBALT	M-39 General Preference Order		

I-226 Limitation Order
M-15 and Supp. Gen. Preference Order

Parts and supplies
Rubber equipment

PRINTING INK (see "Paints & Pigments")

PULP (see "Paper Manufacture")

RESINS

(see "Formaldehyde")
(see "Paints & Pigments")
(see "Phenolic resins")

RUBBER & RUBBER PRODUCTS

Chlorinated Rubber

SARAN (see "Vinyl polymers")

SEALING MACHINERY (see "Packaging Machinery")

SET-UP BOXES (see "Boxes—Folding and Set-Up")

SHOOKS (see "Lumber")

SIGNS (see "Metal Signs")

SISAL (see "Agave Fibre")

STEEL (see "Iron and Steel")

STEEL DRUMS (including barrels)

New steel shipping drums

List of products which cannot be shipped

SYNTHETIC RESINS

(see "Formaldehyde")

(see "Phenolic resins")

(see "Paints & Pigments")

TIN

Closures for glass containers

Collapsible tubes

Tin and lead scrap

Template, terneplate & long ternes

TUBES (see "Collapsible Tubes," also "Tin")

TUMBLERS (see "Glass")

VINYL ACETATE

VINYL POLYMERS

WAXES

WAXED PAPER

WINDOW CARTONS

WOOD (see "Lumber")

WOOD PULP (see "Paper Manufacture")

WRAPPING PAPER (see "Paper and Paper Products")

ZINC

M-11 General Preference Order

(see "Phenolic resins")
(see "Paints & Pigments")
(see "Resins")

COBALT

COLLAPSIBLE TUBES

CONTAINERS

Paper and paperboard

Formaldehyde (for coatings)

Fluid milk shipping containers

Glass standardization

Aluminum

Cadmium

Copper

Nickel

Steel Drums

Zinc

CONVEYORS & CONVEYOR CHUTES

COPPER & COPPER BASE ALLOYS

CORK

COSMETICS

(Copper Containers)

CRACKER BOXES

CROWN CAPS (steel scrap)

DECALCOMANIAS

Paper & paperboard consumption

DETINNED SCRAP (see "Iron and Steel")

DRUMS (see "Steel Drums")

Rubber Lined

DYESTUFFS

Chromium

Dyestuffs

Ethyl alcohol & related compounds

Molasses

ETHYL CELLULOSE

FASTENERS FOR CONTAINERS

FIBRE, AGAVE (see "Agave Fibre")

FIBRE CONTAINERS (see "Containers")

FIBRE, JUTE (see "Jute Fibre")

FIBRE, MANILA (see "Manila Fibre")

FIBRE, SISAL (see "Agave Fibre")

FOILS

Aluminum

Lead

Tin

M-1 and Supp. General Preference Orders
M-38-c Conservation Order
M-43 General Preference Order

M-39 General Preference Order

M-115 Conservation Order

M-241 General Preference Order

M-25 General Preference Order

M-200 Conservation Order

L-103 Limitation Order

M-1-i Supplementary Order

M-65-a General Preference Order

M-9-c Conservation Order

M-6 and Supplementary Conservation Orders

M-45 General Preference Order

M-11 and Supp. General Preference Orders

M-126 Iron & Steel Conservation Order

M-9 and Supp. General Preference Orders

M-8 and M-8-a General Preference Orders

M-9-c Conservation Order

L-239 Limitation Order

M-72-a Supplementary Conservation Order

M-241-a Supp. General Preference Order

M-15-b-1 Supplementary General Preference Order

M-18-b Supplementary Order

M-103 Conservation Order

M-30 General Preference Order

M-54 General Preference Order

M-175 General Preference Order

M-9-c Copper Conservation Order

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Wartime Packaging Conversions

SUBSTITUTES for packaging materials now on the allocated lists or wholly unobtainable, have one outstanding characteristic in common—extreme functionalism. Every piece designed to replace tin-coated metals, rubber hydrochloride sheeting, synthetic resins or other proscribed customary packaging material, has been severely engineered to do its job with the acme of efficiency. Appearance, while not wholly neglected, has taken second place in Spartan fashion.

The packaging field has seen a miracle come to pass. Developments which might, normally, have taken six years have been evolved in as many months, and this in spite of the double pressure of time and non-availability of essential equipment and machinery. Makeshifts and home-made gadgets have shown that the substitutes will serve and can be produced in spite of restrictions . . . what has been accomplished is a tribute to American determination, inventiveness and ingenuity. The possibilities of the future challenge the imagination, but it seems certain that the "necessities" of the past, in the packing field at least, will have to *prove* that they are *better* than the wartime substitutes if they are to come into their own again.

A complete résumé of the entire gamut of container changes is impossible in the space allotted here, for the list is almost as long as that of all American products. A few noteworthy achievements, however, are presented briefly so that any who may face a similar situation may possibly glean a suggestion which could lead to a solution of his problem. The shift from tinned cans to glass, for instance, has been legion, but almost without exception this was accompanied by an additional obstacle: that of finding a suitable closure. Restrictive measures on metals included even the comparatively small quantities needed for suitable caps to fit the glassware, and this has resulted in the development of interesting advancements in the way of substitute materials.

All-metal containers have been replaced by fibre containers, either with metal ends or of all-fibre construction. Developments in the moisture-proof paper field have extended the use of the bag-in-box package and progress has been made in heat-sealing to assure moisture-vaporproofness. A few of the tricks of tinware construction have been adapted to the fabrication of paper, fibre and wooden containers.

There has, of course, been a lot of tailoring of the contents to fit the new ration measurements of dress. The preceding article and chart tell the story of restrictions in packaging materials—from aluminum through rubber and zinc, together with many "indispensable" chemicals, rigid plastic sheetings, synthetic resins and sealing compounds. In the next few pages is a brief outline of some of the things that *have* been done with the hulls, the husks and the crusts left to civilian industry.

Baked Beans Now a Frozen Food

COMPLETE withdrawal of metal for baked bean cans nearly wrecked that industry, and those brands which have not changed to glass packing are completely off the market. The situation seemed to be an opportunity for the Birds Eye Frosted Foods Corp. which, slight altering the processing of the baked beans, is now producing them as a new frozen food item. The principal change in the process consists of completely baking the beans before packing. Previously the final baking period took place after the beans were in the cans—to secure the hermetical sealing and sterilization. Some discussion was evoked as to whether the complete baking before packaging changed the taste, but the public seems to accept the new pack with enthusiasm. The saving of the metal formerly used in the canned beans seems to be appreciated.

Birds Eye is producing the old-fashioned variety of New England baked beans and also the Western style (with tomato sauce) and is contemplating introduction of an all-vegetable frozen baked bean if demand warrants.

Baked in the traditional manner by one of the former packers of canned baked beans, the new product is quick-frozen and packaged on the regular Birds Eye machinery. The package, while new to the consumer trade insofar as contents is concerned, follows the customary design and structure of the rest of the Birds Eye products line. Packaging is identical—except, of course, for imprint of the product name—and distribution is through the channels regularly handling frozen food products.

Credit: Birds Eye Frosted Foods



New in the Print Shop



WPB ORDER M-81, ending the life of metal containers for inks, put the E. J. Kelly Co. on the track of using fibre containers. They turned to a container similar to the one which formerly came into printing plants with the lunch order containing ice cream or coffee—and it has worked adequately. Test shipments have proved the efficiency of the container which has been specially developed for printing inks. It is given a special coating to protect the contents from seeping through, and the package is adequately and satisfactorily filling the place of the metal can.

Credits: Container, Sealright Co., Inc. Label, Kalamazoo Label Co.

Yeast Drops its Foil Wrapper

WHEN metal foils were restricted for wrapping materials, Standard Brands had already been experimenting with substitutes for packaging Fleischmann's Yeast. Paper offered difficulties because of its normal tendency to return to its original shape and the minute size of the yeast-cake which afforded little opportunity for folding



the paper. Specially treated paper was finally accepted after some processing. Glycerin was first used as a

plasticizer but after that went on priorities, invert sugar was used. Titanium also was found to have much the same effect when used as a filler in the paper. Titanium gives opaqueness to the paper and provides a good printing surface. The paper is also coated with a waxy resinous material which not only insulates the sheet from the contents but serves to give the paper heat-sealing qualities, and, because the coating is applied at high temperatures, serves to act as a sterilizer. Adaptation of the original yeast-cake wrapping machines to handle heat seal paper was made by the company's own mechanics. Consumers and outlets have accepted the new-wrapped cake without objection. It retains its identifying mark of the yellow seal and, in addition, carries a contents message imprinted on the wrap. Production speed continues at the customary 120 per minute.

Credit: Menasha Paper Co. for paper and coatings.

Postum in Paperboard

EXTREMELY hygroscopic Instant Postum has gone to market in a type of container that had previously proved its worth in packaging Calumet Baking Powder for General Foods. The former oval metal Postum canister with plug top has been replaced with a similarly shaped canister having chipboard sides and metal bottom with plug-type top. The sides are convolutely wound of board and glassine with a special lining; a moisture-proof lacquered label gives the external appearance that is identical with that of the previous container. Black iron is used for top and bottom, filling is done from the top, and both this operation and closing are performed with the customary machinery. General Foods laboratory tests proved moisture-vaporproofness at 100 deg. F. under 90 per cent relative humidity. Considerable saving of metal, plus trade acceptance, point to probable permanence of the new container. The Calumet can is of similar material although cylindrical in form and is equally moisture-vaporproof.

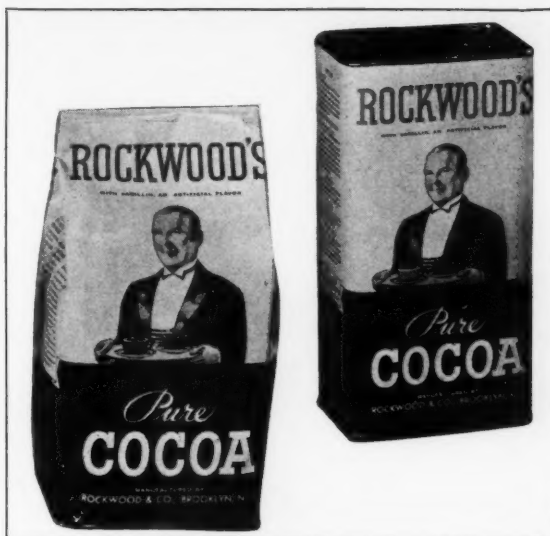
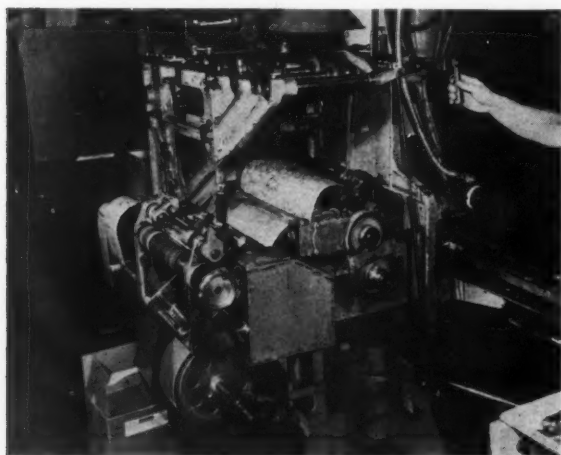
Credits: Postum container by Continental Can Co. Calumet by American Can Co.



Special for the Army

EXPERIENCE in the manufacture of a civilian product was called to military service when Hills Bros. turned to the production and packaging of the fruit bar which forms an important item in the field rations of the army and marines. Candy bar wrapping machines, found idle because of restrictions, were acquired, and worked after having been carefully adjusted to take the new product. Built to accommodate a larger and heavier bar, the machines had to be virtually rebuilt for the war job. Tray dispenser, elevators, rails and belt had to be adjusted to take the new bar, measuring $3\frac{7}{8}$ in. \times $1\frac{1}{4}$ in. to wrap it in cellophane and to heat-seal it. The original bars wrapped in the machine were two inches wide and considerably heavier than the fruit bars. Three months' work was necessary to adapt the machines to their new duties, with special parts supplied by the manufacturer. In addition to enlarging the various sectors, tensions had to be eased to take the more easily crushed fruit bar. A heat sealing unit, home made and installed by the plant's own talent, replaced the glue pots on either side of the machine. The bars consist of a balanced mixture of several different kinds of dried fruits, including raisins, dates, apricots and others as available. After desiccation and mixing, the fruit is hand-pressed into aluminum forms, then taken out of the forms in bar-shape and handed into the machine. Die-cut paper trays form a receptacle for the bars. After wrapping, the bars are pasteurized to guard against deterioration and fermentation. Hills Bros. is a prime contractor for the bars but acts as a sub-contractor for the packing of complete ration kits.

Credit: Package Machinery Co.



Cocoa Rides in Paper Bags

COCOA, traditionally packed by Rockwood & Co. in a four-ply, paper canister with metal ends and plug top, is now appearing in an automatic duplex paper bag using a patch bottom. Another wartime change being made is reduction in the number of sizes in which cocoa is packed—single pound sizes replacing both the $\frac{1}{2}$ -lb. and 2-lb. sizes previously used. The new bag, of 50-lb. white P. K. embossed bond with a 40-lb. natural kraft liner, is imprinted to give the family resemblance of the Rockwood line and is marked "Emergency Package." The top is folded down and over, and glue-sealed. Rough treatment in the plant, and trial freight shipments gave ample proof that the bags would stand the test of actual use. A case of pound-size bags, fully packed, was shoved down a flight of stairs, swung onto a truck and went thence by rail from Brooklyn to Chicago and back. Examination showed that not a single bag had burst, nor had there been any sifting. A limitation of the plant's production to 60 per cent of last year's output was one of the reasons for concentrating on the single-pound unit—to give wider customer coverage, it was said. Production problems involve hand-opening of the bags (at least until machinery is available) and careful supervision on the filling line. Machinery changes necessitated by the substitution of bags included development of a home-made device to hold the bags open and keep them in place while filling. The plant's own staff did the work because priorities prevented otherwise normal replacement parts being manufactured. Pointing toward the likely permanence of the bag-type container, in addition to its efficiency, is the fact that its use permits the saving of 1,668,870 lbs. of metal, in tops and bottoms of the canister, per year. While production of the bags is less expensive than the boxes, and more help will be required to open and fill them on the production line, use of the bags bear promise of permanence.

Credit: Bag by Thomas M. Royal Co.



A Screw-top of Paper

PRODUCERS of Noxema cream, which is an oil-in-water emulsion, found it necessary to get a closure that would substitute for the metal screw-on top and would retain moisture under high limit of vapor permeability to which such a closure would be subjected during its market life. A paper closure was found which had a continuous-thread cap. It is made in two parts—an outer shell formed on round box-making machinery, and an inner part called a "daisy" because of its shape when flat before it is put into the outside shell and the thread becomes continuous. The thread is embossed in the "petals" of the "daisy." The thread is not loaded. An inner liner of the cap affords the necessary protective and sealing requirements. It was found that a neck ring tolerance of .015 in. could be maintained for the jar, and one of .009 in. for the paper thread diameter. Compared with metal-capped jars, it was found that average moisture loss under paper closures in one week was .83 per cent, 1.44 per cent in two weeks, 1.88 per cent in three weeks. Metal closed jars lost .86 per cent in one week, 2.65 per cent in two weeks and 2.78 per cent in three weeks under identical rigorous laboratory conditions.

Credits: Paper closures, F. N. Burt Co., Inc. Glass Jars, Maryland Glass Corp.



Asphalt Now in Paper

THE Texas Oil Refining Co. has turned successfully to a paper 400-lb. drum to replace the metal drum formerly used in packing asphalt for road-building jobs. The new drum is wholly non-metal, made of four-ply kraft, lined with a special material that is proof against hydrocarbons. Ready removal of the contents from the container—simply slitting it with a knife and peeling it off—and ease of disposal, together with lower cost than the metal container, give the new drum a decided edge over its predecessor.

Smaller size packs of asphalt—the 100-lb. size—are being packed in a multiple-walled kraft bag. The bag is placed in a container while being filled with the melted asphalt and then placed on its side to cool. It flattens slightly, making storage and stacking easier than with the drums. Reduction in freight costs is an important consideration. Prospects are that paper containers for this product will be retained even after the war.

Credits: Drums by Plyfibre Container Corp. Coating by Thos. W. Dunn Co.



A Lug-type Paper Closure

CONVERSION from metal tobacco canisters for pound and half-pound packs was hampered when P. Lorillard Co. found that normal metal closures were not obtainable and glass closures were generally unsatisfactory. A four-piece, paper cap was developed which affords the necessary airtight protection to the tobacco. It is a lug-type cap which fits a standard finish and performs adequately. Packaging procedure is normal and stacking and storage are greatly facilitated by the flatness of the new cap. Package identity is retained by the wrap-around label similar to the design on the former lithographed can.

Credits: Paper closure, F. N. Burt Co. Glass container, Owens-Illinois Glass Co.

Glass Conversion Experiences

BREAKAGE, one of the principal obstacles in the conversion from metal containers to glass, has been licked in part at least by Libby, McNeill & Libby by a few simple changes in the packaging department. Canvas belting which has been substituted for leather or rubber, has been found to help cause less breakage. Wood has replaced metal in the construction of a trough through which the belt carries the glass containers. The belt is so arranged that the bottle rides exactly in the center of the 2-in. wooden base and the bottle seldom touches the wooden side supports. Sharp edges are avoided and the glass therefore is not chipped during packaging; an entirely gratuitous additional benefit is a "silencing" of operations—a welcomed relief from the clatter inherent in metal packaging. Another breakage preventer is preheating of the glass before filling and processing, avoiding damage from temperature changes. Cases of glass containers are inverted on to a conveyor and the inside of the containers sprayed with jets of hot water. Later the jars are again sprayed with water of increasing temperature, just before filling, so that the bottoms will stand the "shock" of the boiling contents.

In the plant of the S & W Fine Foods Corp. a special set of metal baffle bars is used at the filling machine so that, should a bottle break, splinters will be confined to a small area and not fly and strike operators in the vicinity. The bottles are then gradually cooled before packaging, being laid on their sides and conveyed



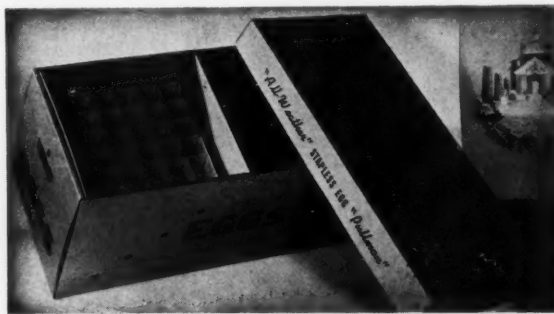
through water sprays of decreasing temperature. S & W has also experimented in the use of colored glass for special products, finding that green bottles "sell" fruit juices better than amber glass. For some other products, the flint bottles are preferred. Label design and color arrangement are also important in breaking down sales resistance.

Preheating glass before packaging is also used by the Folger Coffee Co. to effect a vacuum pack of its coffee. A strip heater is attached to the line at the point where jars travel to the vacuum machine. A non-rubber composition material, used for the gasket, is heated to 115 deg., softening it so that a setting is possible against the finish of the bottle. A paper-lined metal closure now in use requires heat to 100° F. A more recent packing of Folger coffee under 28 in. of vacuum has been facilitated by the use of cellulose sealing rings in conjunction with all-paper caps which make a perfect hermetical seal possible. The cellulose rings are applied while wet and shrink firmly to the cap and glass.

The "Egg Pullman"

SHORTAGES of wood and labor for construction of wooden egg cases motivated development of the "All-Weather Stapless Egg Pullman" now in use in that part of the produce industry. Wartime packaging brought about the development of fibreboard which would withstand the high moisture conditions of cold storage and the insoluble adhesive needed to produce the required corrugated board. Customary content and dimensions are maintained for the 30-dozen egg container, meeting the trade's shipping and storage habits. Ingenious folds permit set-up without stapling by the user, and provision is made for either ventilation or complete sealing as immediate conditions require. The case is so constructed and designed that it will stand several round-trips. Elimination of stapling is a condition requested by the War Production Board to relieve the demand that would otherwise have been created for stapling equipment. The case is easily assembled by the shippers. It comes knocked down flat and merely needs to be folded into shape for use. Assembly is facilitated by the absence of tricky locks or other devices. The top is also folded in position and fits snugly over the edge of the case. For re-trips, the case may again be opened and shipped flat, and folded up again for re-use. Eight to a dozen trips are estimated.

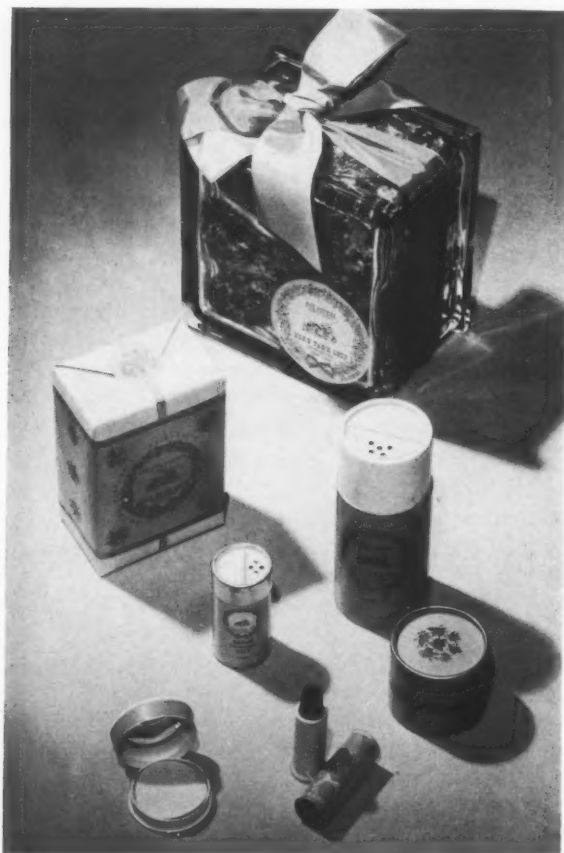
Credit: Inland Container Corp.



Back into Paper Containers

Long ago lipstick (or lip pomade as it was then called) and rouge were packed in paper; highly ornamental metal containers replaced these, and plastic containers were replacing metal when the demands of war took both the latter away. Now lipstick, rouge and even talc are back in paper containers, as witness the line of Herb Farm Shop, Ltd. Even the swivel arrangement for raising the lipstick has been duplicated faithfully, and the two-piece rouge compact has a mirror in the cover as did its immediate predecessor. Dusting powder, too, has gone into an all-fibre container. With the change to paper has come a shift from bronze-gold ink, barred by restrictions, to white and pink on blue, making, the distributors believe, a more femininely attractive package. The blue background obtains from the previous containers. New packages required no change in production methods. The Herb Farms pot-pouri of lavender scents has a Victory package in the glass brick sealed with a strip of cellophane and having the re-use feature. Herb Farms, Ltd., also markets a wide range of spice, tea and perfumery items known to the Fifth Ave. trade. The food line likewise has gone into paper, for example, garlic salt in the sifter top packages and the tea shown below.

Credits: Talc and powder boxes by Cross Paper Co. Lipstick and rouge containers by F. N. Burt. Glass brick container by Owens-Illinois Glass Co.



Paper Bags Replace Burlap

RESTRICTED use of burlap has been met in many fields by substitution of paper bags. The American Agricultural Chemical Co., a manufacturer of farm fertilizers, is one of the firms to find that multi-wall 100-lb. paper sacks will carry the load with considerable satisfaction in general. For normal fertilizers, plain bags are satisfactory; for extremely hygroscopic materials, and for shipment into damp areas, asphalt-laminated bags are required. Both open-mouth and valve-type bags are used, with preference being given the latter because of the labor-saving possibilities. Retraining of help and additional supervision were necessary to prevent unskilled labor from using the familiar bag hooks and "drag" method of handling bags. Paper will not stand that treatment, nor will it survive being stored in wet places. Price considerations also are important, particularly, it was said, because of the relative stability of paper prices in contrast to the fluctuation in burlap prices.

A peculiarity noted is the fact that paper bags are unpopular in the South, where cotton bags have always been used. Part of this objection comes from employers who find that 100-lb. paper sacks are handled no faster than the 200-lb. cotton bags, and part from the workers who always found "re-use" value for the cotton material in personal clothing and for household purposes. One of the factors in favor of paper bags is that, generally, one type only is needed (except for asphalt laminates used for special conditions) rather than several types of burlap to fit each different type of fertilizer.

Credits: Bagpak and St. Regis Paper Corp.

Tobacco in Paper Containers

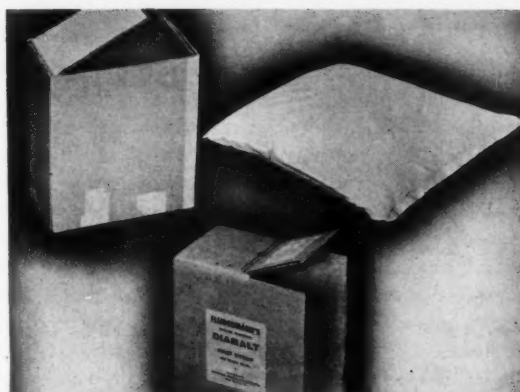
BROWN & WILLIAMSON TOBACCO CO. has converted its entire line from metal containers to paper, employing, in the case of pound and half-pound sizes, cylindrical containers formed of convolutely wound chipboard, with slip-on tops. A cellophane cartridge, secured at the top, forms a bag-in-box arrangement assuring freshness of the product at time of delivery; the government seal is placed either over the top of the container or across the edges of the container and bag so that it forms a coincidental seal for the package, thus guarding against tampering. Filling and plant handling have not been seriously complicated, according to reports, and through the use of the paper containers shipping weight has been considerably reduced. The customary pocket-size tins similarly have been replaced by paper boxes into which the tobacco cartridge is slipped, although cellophane itself has been replaced in some instances by special paper. Brands appearing in paper include Sir Walter Raleigh, Big Ben, Bugler and Target.

Credit: Sealright Container Corp.



A Pillow in a Carton

SEEKING to replace the steel pail which disappeared with the first of the WPB orders, Standard Brands hit upon one of the most unique ideas of all substitutions for one of its products. It is a "pillow" made of closely woven fabric, lined, folded and heat-sealed all around. It is encased in a 500-test corrugated board carton with a sleeve and contains 30 lbs. of Fleischmann's Liquid Diamalt—a malt syrup used in the baking industry. The closely woven fabric is waterproofed with a non-toxic compound which furnishes good protection for the malt syrup. When folded it is heat-sealed except for a 6-in. opening for filling. The bag is put into the carton empty, then filled, sealed for the additional 6 ins. and the outer carton slipped on. The combination of the bag in two cartons is patented. The bag fits into the carton so that no undue strain will cause failure in shipping—there is enough "give" in the bag to allow a severe blow without damage, and tests have been run in the revolving drum up to 500 drops in which the



cartons were damaged but the bag remained intact. The package is identified by a large label pasted on the side of the outside carton. This will be replaced in the near future, it is said, by actual imprinting on the carton itself. Another label is pasted on the short flap on the top of the package, which acts as a hinged flap to protect the contents after initial use. To open the package, the sealing tape is cut on three sides of the top flap. This is then bent back, revealing the fabric corner of the bag, which has been previously marked with a rubber stamp leaving a straight line at the point where it is to be cut off, and the contents are then poured out, using the corner as a "spout" which is folded back after use until the contents are again needed. Replacement of a 30-lb. container for the previous 60-lb. pail brought into the company's customers' list many bakers who preferred the smaller size container. Waterproof compounds for the fabric are made of non-critical materials and the package is recommended for aqueous and oil-base materials; acid base materials if the lining is adjusted to them. Standard Brands has announced it will give permission to other manufacturers to use the package for military and lend-lease purposes and also for civilian products.

Credits: Weather-proof coating for fabric, Gordon-Lacey Chemical Products Co. Cartons, Star Corrugated Box Co., Inc. Developed by Thomas R. Baxter.

Spices in Paper Boxes

DURKEE Famous Foods faced the metal can restrictions with qualms because of the diversified nature of their spice line. While the tinned metal containers were readily usable with little regard to the contents, the problem in the use of fibre and paper canisters was more complicated. Some spices required different types of liners—oily products such as mace, nutmeg, clove, mustard, pumpkin pie spice, chilli powder, tumeric and curry powder must be packed with oil-resistant liners; black, white and red pepper, cayenne and ginger, being non-oily, can be packed in less critical materials. Also to be considered is the fact that an ounce of one spice will require more bulk-space than the next; for instance, nutmeg was formerly packed two ounces in a 1½-oz. tin by tamping it down; but tamping in the paper container caused bulges which stopped the production line. A special holder had to be devised to grip the container until the tamping was completed.

Lack of uniformity in dispensing and use also increased the variety of types of containers. Some spices, to be used by the teaspoonful, require plug tops; for others sifter tops or dredge openings must be used. Fortunately government regulations permit the use of certain types of salvage metal to be used, and Durkee is permitted to pack in fibre-bodied, metal-ended containers—but the return to normal will be made as quickly as possible.

Credit: American Can Co.



Motor Oil in Bottles

ONE of the most interesting wartime metal-to-glass conversions is that made by the Pennzoil Co. in marketing its motor oil in glass bottles. The bottle is amber in color, 10 ins. high and weighs but 15 oz. Easy and economical to fill, seal, label and pack, it conserves labor as well as the metal previously used in the cans. In fact, company officials state, using the 60-lb. black-plate cap with non-critical compo cork gasket, 10,323 closures can be produced from the metal previously needed for 290 quart-size oil cans. Removal of the top with a conventional hook opener damages it so that it cannot be re-used. The finish is off-size preventing the refitting of any regular cap or cork. It is possible to use the bottle in direct filling from container to some cars without use of special metal equipment such as funnels, etc. The bottle drains in 14 seconds, a third of the time necessary to drain the can. Packing is 20 bottles to the carton—five gallons—convenient to handle, invoice, etc. Another quart-size container of different shape has been adopted by the Kendall Refining Co. for its 2000 Mile Oil, formerly packed in a metal can. The new jar is safety sealed and thus made tamper-proof when the seal is applied, as the metal cover is screwed on at the refinery. Re-use value of this bottle for home-packing is stressed as a sales feature. One of the features stressed by some of the oil companies now packing in bottles rather than in cans is that opening a bottle is much easier in the case of unskilled help—or particularly women attendants—who are being employed during the wartime shortages of skilled male oil station men.

Credits: Pennzoil—Anchor Hocking Glass Corp. Label by Derrick Publishing Co. Kendall—Knox Glass Bottle Co., for jars. Ferdinand H. Gutmann & Co. for cap and seal.



Wartime Design Is Functional

by J. C. Seager

WITH precedents being shattered as a matter of course in this wartime era, the packaging industry must fall into line with a complete revision of its practices and philosophies. If manufacturers think they have broken all the rules this year, next year will prove there were a few they overlooked. The most far-sighted user will have had to brace himself, if he hasn't he will be bowled over. During the year ahead and for the duration, former basic materials will be restricted practically without exception. The metal container, the cellophane wrapper, the rubber-sealed jar will be curiosities.

Compared to the problems that are bound to arise, last year's dilemma will seem like child's play. In the gradual change-over from total peace production to total war production, there was a certain margin of research manpower available to large producers of packaging materials. As a consequence, there has been some development of new packaging materials. As war economy presses more heavily upon this manpower, it will eventually become non-existent. When this happens, the man who wishes to place his merchandise on the distribution counters of America must assume responsibility for developing his own packages. No one else will be free to solve his problem. The coming problem is threefold: materials, production, manpower. What can the manufacturer and designer do?

Wartime packaging patterns

To begin with they should reduce the package to its least common denominator. They should be concerned with only one thing—with that overworked but not-to-be-underestimated quality of a package, its function. They must do the job with the greatest economy of material, without the use of strategic materials. Over-packaging will be a cardinal sin. Of course, the manufacturer will protest—"I must have an inner seal, an outer seal, a label, and an intermediate container." The obvious reply to that is, "Why?" Why two seals? Why an intermediate shipping container? The problem must be approached with an entirely new thought pattern. Forget the past and remember that lingering scrutiny may mean a saving, which will ultimately spread the available supplies, perhaps to some other manufacturer with a tougher nut to crack. Also remember that the public is a "different" public, and that it does not expect or want to be treated with 1929 obsequiousness. Packaging philosophy must be adjusted to the national emergency. The package will not be regarded as a competitor in a pre-war race for popularity. Aesthetic values are important, but they are incidental to function.

The past year has proved two points: One, that the public has been far ahead of the manufacturer, as well as the Government, in accepting the rigors of wartime economy; and, two, that there has been an undercurrent of resistance to change on the part of the manufacturer.

To support the first point, sales have not been affected in the least by the paper packaging of such items as lipsticks, spices, shortenings, tooth powder, etc. Based upon this public reaction, it is not impossible to imagine that the "cracker barrel" might be taken in stride, provided it were given ingenious design treatment.

Worst hit during the second year of the war will be the manufacturers who cannot, or will not, alter their basic concept of packaging. These have been the men, who, instead of writing the old methods off the books and starting from scratch, have tried to keep one jump ahead of the latest WPB Order. Many well-known items have disappeared from counters temporarily or permanently as the result of this inertia. A perfect example is found in the process of relinquishing the tin container. Instead of abandoning the losing fight, manufacturers and users have scurried from tin toterneplate to black iron; from a fibre body with tin top and bottom to a fibre body with terne top and bottom. The final step was black iron top and bottom. As a result, the package became increasingly inferior as each step proved to be a mere makeshift. The same thing has been true, in many cases, in changing from metals to plastics. Only a general lack of initiative and vision accounts for the predicament in which many manufacturers find themselves.

It has been the designer's role (though little understood) to assist in obviating these last-minute, ugly shuffles while planning succeeding solutions. A case in point is an experience with an all-paper, swivel lipstick container which was developed months before any restrictive metal orders were issued. It seemed highly probable to the manufacturer, even before Pearl Harbor, that metals and even plastics would be denied for cosmetic packages. Twenty or thirty manufacturers are using this and similar containers. They are assured of reaching their markets for the duration. Such reasoning should not be restricted to designers. It should be practiced by manufacturers, and ideally by the manufacturer in conjunction with the designer. Fortunately, the designers do not have to concern themselves with precedent. They have no sentimental attachments to products or packages. No company president cries "Save my old package; grandfather, who founded the company, loved it so!" No advertising manager threatens the designer with a diving sales graph if so much as a pink rosette is taken from the familiar wrapping. The designer respects the value of tradition in packaging, but he is neither overawed nor paralyzed by the prospect of modernizing a badly designed package.

In the year to come more emergencies are bound to occur; they will be fairly similar to last year's, they will be more of the same. We can expect increasing pressure upon strategic material and, finally, even upon last year's substitutes. Metals might as well be forgotten

except for irreducible essentials and as Army and lend-lease materials. Glass production is gradually approaching its limit; the future of plastics also, except for the packaging of absolute essentials, is far from bright. Overseas shipments are bound to increase in multiple proportion to the forces being sent abroad and packages which leave this country are not salvageable. The Government's patience will have worn very thin with the manufacturer who has forced the use of strategically important materials simply because he has had a presumably legitimate excuse for his demand.

This, of course, is where the designer can take over. As a matter of fact, he has been preaching the philosophy of simple design and packaging for 20 years. As a stylist, he is firmly entrenched in the business world. For instance, glass packaging, which may be new in some businesses, is going to present many stumbling blocks to the uninitiated. The labeling of a glass container requires a new approach. No gaudily lithographed tin can label can compete for interest against the most impelling eye-catcher of all—the clear, natural color of fruit and vegetables. Here the designer must preserve brand identity against a most exciting background. Such packaging will require great subtlety, for the dinner plate with its appealing "Brown's Peas" has been transferred to the store shelf.

Value of high standards

As more innovations are forced by sheer necessity, appearance will play an increasing part, despite the fact of rationing or of a seller's market. The manufacturer must guard against any possible reaction in post-war times when conditions revert to a buyer's market. The memory-value must be raised to higher standards to compete against the distraction of point systems, shortages and regulations. The greatest ingenuity, therefore, must be used in the appearance of these temporary or substitute packages. Forms and materials may in themselves provide factors to be overcome and in many instances a total breakaway from the old concepts of design will have to be made in order to keep alive the strong competitive eye-appeal position of old established products. This is intensified by the enormous growth of mass merchandising due to the rapid increase of the supermarket type of distribution: the tendency to let the customers wait on themselves. More than ever before will the broad vision and clear thinking of the designer be needed.

Any well-integrated design organization is, and always has been, in constant touch with many new developments, new materials, and their sources. The designer thinks in terms of the extraordinary, of the never-before-done. Such an organization in seeking a solution for a given problem may find something which can prove valuable when applied to another problem in an entirely unrelated field. Packaging, in these times, may well benefit by such information. This is the type of adaptability which the manufacturer of salable goods must have within his own organization and with his outside associations.

Only intelligent planning and vision can prevent the lag in the movement of merchandise to the sales count-

ers. The manufacturer, with or without the designer, must shoulder his own problems. Many have and are being solved. Vinyl resin coated liners, because of the peculiar characteristics of the plastic, have been an Alpha-Omega for the entire closure industry.

There is no more vinyl resin available. However, other paper coatings have been developed to meet the needs of individual specific cases. Various types of paper coatings exist which require no strategic materials and are proof against certain types of liquid and pressure; other coatings will not break down in contact with greases poured at 200° F., and others will house and withstand the action of essential oils. None of these coatings are interchangeable, but each is an answer to a given problem.

New sources of material

The forests and the farms will open new vistas in basic materials, and even what was formerly considered waste in some processing plants may well develop into entirely new materials for the packaging field. Lignin and bagasse are so new that we have only begun to understand their possible potentialities. There is every hope in the packaging field that they may prove as versatile as the soya bean in other fields.

Consideration should be given by both the manufacturer and the designer to the enormous number of small, idle plants, in many of which machinery is unused or not operating at its fullest capacity. Just because corporation "A" has produced a certain type of container for years and is now filled with war work, is no reason why a substitute container cannot be manufactured through other sources. Small factories do not have the experience or research staffs required to bring forth the potentialities of their idle machinery. These must be demonstrated to them, and their facilities made known to the manufacturer by the designer or small plant owner. In this day, when we read of the possible destruction of "little business" that has not been included in the war effort, we should recognize this logically fertile field for the development of packaging materials and techniques for what might be considered non-essential merchandise.

Finally, the connotation of the word "substitute" is unfortunate. Aluminum was a "substitute" for steel, wood and fabric in the airplane. Today this aluminum has become the permanent material of manufacture. So, many of the new materials and packaging techniques, developed in today's time of emergency, will become the standard practices of tomorrow. Untapped sources of manufacture, new fountains of material must be discovered. Each manufacturer, without waiting for his competitor or his regular supplier, must solve his own problem. He must secure intelligent advice about his potentialities for the future. For the duration the manufacturer and designer must forget, to a great extent, pre-war packaging in terms of materials, shapes, etc. He must even forget 1942. He will find that the reserve of ideas, convertible machinery and undeveloped materials lying dormant in the United States will carry him over this most difficult period successfully.

Testing Packages and Materials

by C. A. Southwick, Jr.

ANY testing method first must be reproducible and, secondly, the values reported must be a useful index of some phase of package performance. For example, a wet-strength paper has been found to fail in use as the wrapper of a damp product during a quick freezing operation. A control method using either a bursting or a tensile test on the wet paper made it possible to set values for the supplier which stopped such failures. It is also important that the test method produces results in numerical terms so that the data can be recorded.

It should be recognized that a test method is only useful as an index of performance to a limited degree and that a change in the packaging material or the product can change this relationship. When this occurs a new test method or methods must be found which will again serve as an index of performance. The establishment of this relationship for a package is a serious matter and it should be decided only after very complete trials and observations both in the laboratory and in the field.

Unit tests of the materials of packaging are useful as quick and sure methods of maintaining quality in both the supplier and the user plants. Material and package tests are also necessary to study production and improve quality, briefly, for research.

The number and kind of tests needed to define a substance are determined by the complexity or functional properties of the material. While many unit tests are done at 73° F. and 50 per cent R. H., it may be desirable

to make some at a special temperature or humidity level. In the case of frozen products, tests should be done at 0° F.; for products going into the tropics, test might be done at 120° F. and a humidity of about 90 per cent.

Methods of testing

In general, unit tests must be integrated with the tests on the package, the composition of the product and the conditions and place of handling and use. Nearly anyone can follow the techniques and perform the manipulations needed to obtain test data, however the choice of the test and the application of the result requires good judgment and same depth of experience.

Tests of mensuration

This group of tests is confined to determining the size of materials: briefly, dimensions and weight. Many packaging materials change their dimensions and weight with changes in the temperature and humidity of the air, but for most practical or control purposes these changes are too small to be important.

However, this lack of dimensional and weight stability should not be forgotten and precise measurement must be made at standard conditions and with suitable pre-conditioning. The Technical Assn. of the Pulp and Paper Industry (TAPPI) method of making basis-weight and area tests should be adopted for all packaging materials. The determination of weight per unit of area is

MATERIALS TESTS

PHYSICAL PROPERTIES

A. Mensuration

1. Area
2. Weight per unit of area
 - (a) of base
 - (b) of added material
3. Caliper or thickness
4. Specific gravity or density

B. Strength

1. Bursting
2. Tensile
3. Tear
4. Fold
5. Flexibility

C. Special Properties

1. Elongation
2. Porosity
3. Gloss
4. Smoothness
 - (a) no pressure
 - (b) under pressure
5. Opacity
6. Transparency
7. Color

FUNCTIONAL PROPERTIES

A. Permeability

1. Air and fixed gases
2. Water
 - (a) absorption
 - (b) penetration
3. Water vapor
4. Oils and greases
5. Organic vapor

B. Special Properties

1. Pressure and heat blocking
2. Melting range
3. Sealing strength
4. Resistance to special agents
 - (a) war gases
 - (b) solvents
 - (c) acids, alkalis and chemicals
5. Stability
 - (a) effect of light, heat and age
 - (b) dimensional and weight
6. Flammability

PACKAGE TESTS

1. Physical

- (a) compression
- (b) tumbling and drop

2. Permeability

- (a) moisture migration
- (b) grease penetration
- (c) flavor loss
- (d) water

3. Special

- (a) war gases
- (b) oxygen and other fixed gases

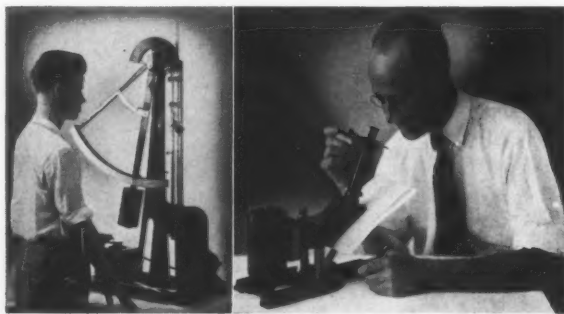
Above are some of the more important types of tests as a result of which good material specifications could be written. Some materials will require all of these tests, others only those which outline their particular properties.

a simple matter and requires only a sample of known area and a means of weighing sufficiently sensitive to obtain an accurate value. Even though the means of making this test is simple, the method of expressing the result for papers has been confused by outmoded tradition and hallowed precedence. The paper trade practice of reporting paper as pounds per ream has become very confusing because of the varying size (area) of a ream of different types of paper, and because paper and paperboard are such an important and large part of packaging. There is a different size (area) of ream in use in each branch of the paper industry and the resulting confusion has caused many errors and losses of material. All packaging materials should be reported in terms of *pounds per 1000 sq. ft.* of area and also in *square inches per pound*. These rational and simple bases would make it easy for both the manufacturer and the user to determine and to compare cost per unit of area (i.e. yield).

While the area and weight determination on the original sample is very simple, this test gets more involved as it becomes necessary to measure the weight of the various components of a structure. For example, the determination of the components of a lacquered one-side laminated glassine requires a very careful technique and an ingenious combination of methods. Nevertheless such data are necessary to write an adequate physical description or specification of a packaging material. Incidentally, it is well to bear in mind that commercial materials may vary from sample to sample and perhaps more so between different production lots. Such variation will be infinitesimal in dimension (area) but can be serious in weight especially for experimental or very complex structures. However, there should be no hardship on either producer or user if the generally accepted tolerance of plus or minus five per cent deviation is allowed from the specified weight.

The determination of thickness is a quick and simple test, but one which should follow the sound engineering principles as described in TAPPI methods. Specific gravity or density tests depend upon a careful measurement of volume (i.e., thickness). The values for density should be expressed as pounds per cubic foot, while the value of specific gravity is a ratio (of the density of the material to the density of water at a specified temperature) and can be expressed as a simple numerical value.

Left: Testing for tensile strength of packaging material.
Right: Testing for gloss. Photo Bureau of Standards.



Strength tests

The second class of tests under the heading of "physical properties" covers the most important and commonly used tests for determining certain kinds of mechanical properties of strength. These tests all require specialized apparatus, rigid techniques and should be performed at the standard TAPPI conditions of temperature and humidity (73° F., 50 per cent R.H.). However, control of quick tests made without atmosphere control are useful but should not be used for research or arbitration.

It is evident from the test name what property each method measures, but it does not follow that each of these properties as tested is a factor in package performance. This is true because some test methods give arbitrary values which are not directly related to any package property. Such tests are folding endurance and flexibility in this group. The results of these tests are numbers which must be used in a comparative way or which are some useful index of material or package performance. Other tests in this group are bursting strength, tensile strength and tear resistance and are reported as the force or work required to burst, break or tear the sample. Such values are primary or direct indices of these properties either in the material or the package.

Special properties tests

The six tests selected in this group are: elongation or degree of strength, porosity, finish, smoothness including conditions "at atmosphere" and under pressure, opacity, transparency and color.

Elongation or stretch is a necessary property of materials for some packaging uses. Materials which are to be stamped or similarly handled or which may encounter quick stresses should possess some degree of stretch. However, for some uses the amount of elongation should be kept to a minimum because such dimension changes during processing would affect printing register.

Porosity tests are useful for some kinds of packaging materials but of no value for materials which are heavily coated or for transparent or plastic films. Porosity is expressed as the length of time it takes for a fixed volume of air at known pressure to pass through the sample. This test measures the freeness of a material structure in terms of air-transmission.

Gloss is the property of a material in terms of its specular reflection of light. The means of determining its values are therefore optical and there are many different pieces of equipment for performing this operation.

The next property of materials in this group is *smoothness*, which can be defined as the degree of perfection of the material surface as compared to a perfect plane. This test is made by measuring the time for a given pressure of air to leak between the material and an optical plane. In other words, if the material were as smooth as the optical plane there would be no air leakage. Smoothness is indicated (a) under no pressure, and (b) under pressure, because of the fact that in printing and certain other operations, the pressure involved can compress some materials to the extent that their smoothness is different than under normal conditions.

Transparency can be defined as the degree of clarity of a material. Opacity can be differentiated from transparency by comparing opacity to a ground glass which transmits light but through which type cannot be read, while transparency is like clear glass.

The measurement and differentiation of color is a very difficult and complex process requiring much equipment and skill. Most color tests, however, are made by comparison against standard samples or color standards. It is possible to evaluate color precisely by means of the spectrophotometer which analyzes a sample in terms of its reflection of light over the visual spectrum. With this equipment it is possible to specify color on the basis of dominant wave length, purity and visual efficiency.

The next group of tests is necessary to establish the protective qualities of a material in terms of certain functional requirements. These functional properties of materials are also important functional properties of the finished package.

The determination of the permeability of a material to gases or liquids is actually reported and performed as the migration rate of the gases and liquids through the material. There is little difference in the apparatus or the technique for most of these tests. Actually, there is no standard method for some of these tests and none ever described for a test of organic vapor permeability.

All of these tests consist of measuring either by volume or weight the quantity of active agent which passes through a sample diaphragm in a given length of time and under carefully controlled conditions of temperature, pressure and humidity.

It is also important that the absorbing means or pressure differential across the diaphragm be reported. This whole group of tests is very important and is the basis by which better and lower cost materials and packages will be made.

The remaining two tests of this group, for water penetration and for oil and grease penetration, have been standardized by TAPPI. In both these tests the results are expressed as the time in seconds for water or the test liquid to penetrate through the sample at a given temperature and humidity.

The determination of the pressure and heat blocking characteristics of a material is important in storage and in machine operations. This test is performed by using two strips of a sample under a known load at a controlled temperature and a limited time. At the completion of this time, the samples should not adhere together.

The test for the melting point or range is a simple test which is made by techniques established by various commodity industries.

Sealing strength is important now and will become more so as stronger and more functional packages are made. The test can be made by measuring the force necessary to separate a known length of seam. The preparation of the seal, the way it is separated, the rate of pulling, and the temperature and humidity are important variables which should be standardized.

The stability of a material is important in terms of its ability to retain its strength and functional properties

and also to keep its shape and weight in storage and in use. Light, heat and age affect nearly all materials to some degree. It is necessary to know the extent and rate of such changes under various conditions. Such tests usually consist of testing part of a sample for several important properties and then exposing the rest of the sample to controlled conditions of light or heat or oxygen concentration. After a suitable interval of exposure, the sample is re-tested. The difference can be reported as the percentage reduction of that property under the conditions of the test.

The test to determine the dimensional and weight stability, as to time and under various conditions of temperature and humidity, is performed in a similar manner.

The ability of a material to resist burning is important for many war uses and also a few civilian requirements. The flammability can be reported as the rate of burning of a material, or as the temperature necessary to sustain combustion, but is many times expressed as a comparison with a common or standard material.

Package tests

The physical testing of inner containers or packages has never been given its proper attention although much work has been done on the testing of shipping cases, wood boxes, etc., by means of laboratory tumbling methods based upon rotating drums. There is no reason why similar but less rigorous techniques should not be applied to folding cartons, fibre cans, paper bags and all other package forms. Certain of the rigid types of packages could also be subjected to some type of compression test to determine their load-carrying or stacking ability. Physical tests of this kind could be carried out at both low and high humidities. The results of tests of this type, when properly correlated with tests of the package materials, would make it possible to establish workable indices of many of the material tests. Also such data could be used in writing performance specifications and would be useful in a research program on the factors contributing to package strength.

The laboratory evaluation of the ability of a package to deliver its contents in usable condition, depends upon test methods which use controlled atmospheres. These atmospheres are selected so as to simulate severe storage conditions and will give final results in a relatively short time. The degree of acceleration depends on the product, the packaging materials, the type of storage, exposure, and the approximate location of the marketing area. Each of these phases must be known and the final answers will determine how much the storage of samples can be accelerated. For example, paraffin wax is an important part of many packages and a material of established usefulness. It is obvious that the temperature of a test cabinet should not be high enough to melt or affect the physical condition of the package as such a change obviously affects the protection. Also certain products can only be preserved below a given temperature. Thus it would be unfortunate to test frozen food packages at a temperature above their melting point.

For most products, the raising of the temperature and the humidity at a very high or low degree of saturation is a proved reproducible means of obtaining valuable and sound data on package performance in the laboratory. In fact, data from such tests alone, if intelligently used, are sufficient to determine the most effective package. One or two rooms or cabinets properly constructed, controlled and operated, form a scientific basis for package evaluation as compared to the method of field trial. The field trial is expensive, long, not reproducible and may be misleading because of unusual weather.

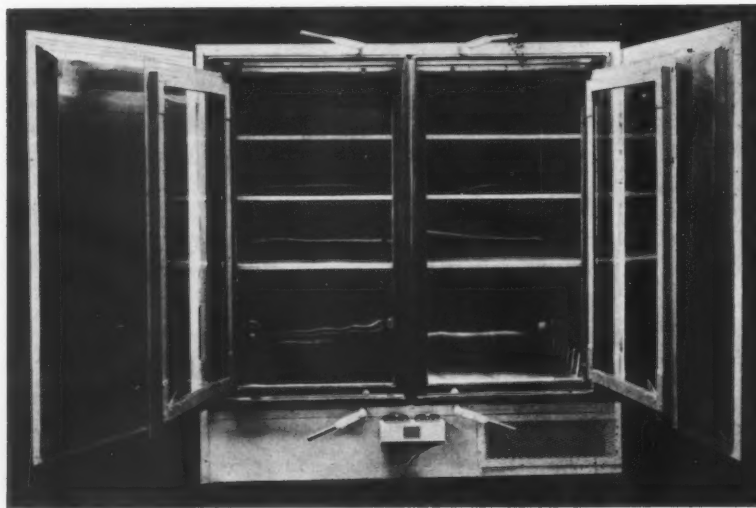
For products to be sold from the open shelves of retail stores in continental United States, a temperature of 100° F. or 37.8° C. has proved to be entirely satisfactory. If the product is hygroscopic or dry, or can be deteriorated by excessive moisture, then the humidity level

should be held at 90 per cent R.H. For products which carry a high moisture level or which can be spoiled by becoming dry, the moisture content of the air should be kept at about 40 per cent R.H. Products which are to be shipped into or through the tropics might better be tested at 120° F., using the same levels of humidity.

The construction and control of good package testing cabinets or rooms is more difficult and expensive than most people realize. Any apparatus controlling humidity must be designed and built by competent engineers. Home-made units and those converted from refrigerators and ovens are short-lived expedients which require constant attention and invariably spoil valuable samples. A properly designed cabinet should not cause precipitation of moisture on the packages at any time, since water is not a hazard in commercial practice with goods sold from open shelves. Also the air velocity around the packages should be very low. These two requirements, plus the fact that at 100° F. and 90 per cent R.H., water vapor has a pressure about 9 oz. per square inch greater than normal atmosphere, show some of the problems in cabinet construction. Package testing equipment bought from an experienced maker, together with good control instruments and materials, gives the most in satisfaction.

There are two other points which always come up in discussing package-testing equipment. One is whether to use a cabinet of volumes up to about 60 cubic feet, or a room of much larger volume. This is a matter of cost, space and volume of samples since either type can be made to operate at the same conditions. A room should not be built only to give space for someone to weigh and inspect the samples as this can be done much more comfortably and efficiently elsewhere, especially if the test atmosphere is held at 100° F. and 90 per cent R.H. For all practical purposes except in case of a large volume of samples, the cabinet is much easier to operate and much lower in cost.

The remaining point is whether a testing atmosphere should be held at a fixed value of temperature and humidity or should uniformly vary these conditions by means of a predetermined cycle. Control equipment has



Above: GFMVT cabinet containing apparatus which consists of an electric heating coil to warm the moist air, which, impelled by a fan, travels through the cabinet to surround test samples of materials. Below: A new type testing cabinet for finished packages. The big doors afford an airtight seal for complete control of both temperature and humidity. Photos General Foods Corp.

been on the market which makes possible any variation of temperature and humidity in the cycle and any number of complete cycles per 24 hours. There are some limits on the possible rate of change of temperature because of the danger of precipitation of water and also because of the heat capacity of the "load" in the chamber. A chamber having such a cyclic controller is very expensive and difficult to build and if not used with great discretion can give very misleading and valueless data. The main reason advanced for the need of a cyclic chamber is that it simulates the changes of temperature and humidity of day and night.

However packages spend part of their life in warehouses where little temperature change occurs and the rest of their life on shelves in stores or homes, where temperature and humidity changes are less than occur in the outside air. A cyclic controlled chamber is not advised or necessary but if available should not be operated through more than two cycles per 24 hours, and temperature and humidity changes should be kept small.

All products show some change in state or composition in the process of deterioration with age and the proper choice of the means of following breakdown can simplify the work and insure the accuracy of the final conclusions. For example, one means of measuring the condition of baking powder is by measuring the CO_2 content but unfortunately this product is well on the way to complete spoilage before CO_2 loss occurs in a package test. Since CO_2 release can only occur when baking powder goes above a certain moisture content, the simplest index of the protection given by the package is the amount of moisture picked up by the powder.

Products which contain fat or oils could be examined for increase in oxygen absorbed, but some types of packages may show oil stain and become unsalable before product deterioration is effected. Fortunately, most products and packages can be tested for gain or loss of moisture content and this simplifies both the procedure and the supplementary equipment needed. On this basis not less than a dozen packages of each kind are filled from a well-mixed batch of typical product. Both product and packages should be the best possible approximation of commercial practice and this probably does not correspond to perfect hand samples.

Each package should then be indelibly coded and weighed on a gram balance to the nearest $1/10$ gram. They are then placed in an atmosphere which will cause a large change in moisture content. Each package is quickly weighed in the same manner at the same time each day or week or whatever interval gives an easily weighable difference. After a short time the packaging materials come to moisture equilibrium and after that the weight change of the package usually follows a uniform rate and all of the weight change represents moisture gained or lost by the product. Very rarely is a product encountered which has enough loss of volatile matter or gain by oxidation to affect the accuracy of this method. Such products must be tested by a technique based on these extraordinary constituents. In every case

the testing time should be long enough to render either the package unsalable or the product unusable.

The index of the protective qualities of each package type is the average weight change of the packages for a given period after arriving at a uniform rate of weight change. This method of using gross package weight changes as an index of performance is criticized by those who prefer to follow the change in the actual moisture content of the product. The method of following changes in the moisture content requires much more care in preparation of uniform samples for analysis and much more labor, time and extra equipment. However, the method produces excellent results if carefully done, but as a check the method of gross weighing should also be done on the same samples.

Penetration or absorption of grease or water into package materials produces severe discoloration or softening.

A simple test method is to store the samples until the package becomes unsalable or unusable. In these cases there is no need to weigh the samples and comparisons can be made on the basis of the time required to show failure. Either grease or water in a product *must* be held by that part of a package which is in contact with the product (i.e., the liner or lining surface). Conversely exterior water must be held out by the outer surface.

Flavor loss can best be measured by taste and smell tests before and after being exposed to storage.

It is advisable to hold control samples at low temperature so that direct comparisons can be made after various intervals of storage.

The testing of packages for their penetration of, or deterioration by, various gases is an obscure and little publicized subject. War gases appear to render unusable all fibre packages but the test methods have not been outlined or standardized.

Conclusions

The degree of usefulness of any material test is determined by whether or not it is a good index of some phase of package performance. Many material tests are of limited usefulness in the final evaluation of a package.

Packaging tests are the means of evaluating package forms, types and combinations, in terms of their functional properties and future performance under severe conditions. They are best performed when using an atmosphere of controlled temperature and humidity at levels which cause deterioration of product or package.

Recommended atmospheres are: 100° F. 90 per cent R.H. for hygroscopic products, 100° F. 40 per cent R.H. for products with high moisture levels; frozen foods 0° F. low humidity. These conditions provide acceleration of the test without change of state of most products or any practical packaging material. There is no need for cyclic control of atmosphere, which must be used with discretion. Simplest technique uses weight-change of filled package over a period of constant rate of gain. This value becomes an index of package performance. Special products or packages may require special method of evaluation.

Color Reproduction

by Herbert J. Kaufman

NO MATTER which system is used to describe a color, we must acknowledge the fact that all color possesses three characteristics. Just as in measuring a box, we give its length, width and depth, so, too, in measuring color, we use the three dimensions of hue, value and chroma.

Hue is the quality by which we distinguish one color from another, as red from yellow or yellow from blue. *Value* is the lightness or darkness of a color as compared with a scale of grays from white to black. *Chroma* is the strength of a color or the quality by which we distinguish a pure color from one that is grayed.

To apply these three dimensions, we first describe the hue of a color, as green, then designate value or the lightness or darkness; and to complete the description, give its chroma, whether it is a rich or a grayed green.

Primary considerations in the selection of package colors are visibility and legibility. The principle to be observed here is that of sufficient contrast in value. Differences in value, without regard to hue or chroma, may make or mar the result. Contrast in value will make lettering or type, legible or illegible. A color of middle value will be least distinguishable on a color of equal value and the greater the contrast in value, the greater the legibility. In this connection, bear in mind that simultaneous contrast affects value contrast. A neutral gray of middle value appears lighter against black and darker when contrasted with white. The same thing holds true with any given hue.

Reproduction methods

The processes available for reproduction fall into three major classifications, according to whether the surface is raised, level or lowered.

Letterpress: Printing which comprises reproduction where the image to be printed is raised. Type, line cuts, halftones, bendays, stereotypes, electrotypes, tint blocks, rubber plates, wood cuts, linoleum blocks, etc., fit into this category and are the means of reproducing copy. The raised surface permits the inking roller to leave a deposit of ink which is then deposited directly on paper. Obviously, the plate or cut must be in reverse so that the image is positive on the paper. Sheet- and web-fed presses are utilized in this process. For halftone and four-color process work, it is necessary to use smooth surface or coated papers.

Planographic: In this process, image is on the same plane as the non-image area, but the image is ink-receptive while the non-image section is ink-repellent. The principle of oil and water never mixing applies in this process. In the early days of lithography, blocks of stone (limestone) were used, but today thin metal plates (aluminum or zinc) are the rule. The image is positive, since a transfer of the inked impression is made first on a

rubber blanket, and then on the paper. Hence the commonly used term, "offset lithography." Some direct lithography, using the reverse image, is still being done. *Photo-Lithography* is the photo-mechanical method for making press plates. Two types of plates are used: albumin and deep-etch. The latter has an infinitesimally lowered image section. Most presses are sheet-fed (some web-fed), and almost every type of paper from rough surfaced to fine coated can be utilized.

Collotype or photo-gelatin: This process is based on the oil-and-water never mixing principle. The non-image areas are made ink-repellent by allowing the exposed gelatin-coated plate to absorb varying amounts of a glycerin solution. Unlike the lithographic process, no water is used; the required moisture is drawn from the air. Another dissimilarity is that no screen is used, since the finely reticulated surfaces of gelatin produce a print closely resembling a photograph.

Intaglio or gravure: This process is just the reverse of the letterpress method. The image is below the surface and can be likened to ink wells. The reproducing plate or roller consists of regular (screen) or irregular (grain) etched impressions, or lines and dots engraved by hand. These are filled with ink and the surface is then wiped with a "doctor" blade, thereby removing excess ink. The inkwells or cells, which are of varying depth, then transfer their different quantities of ink to the surface of the paper (sheet- or web-fed).

Gravure differs from letterpress and lithography in that the gradation of tones is effected by varying the thickness of the film of ink transferred to the paper, rather than the size of the dots. However, in the new (Dultgen) halftone method of reproduction used in color gravure, the dots are larger for solids and the film of ink thicker than in the light tones.

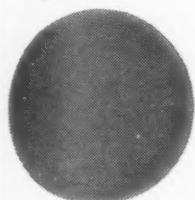
In addition to these three major reproductive methods there are others such as silkscreen, novaprint, thermographic, etc. It is best to consult an expert in the respective fields for advice on how to print. All processes have their advantages and disadvantages, depending on what you plan to achieve, and all produce different results. For further details of any particular process, a reference list is appended.

Copy selection factors

Another thing to consider is that copy must be prepared differently for various reproductive processes. In general, copy that is good for one process is good for any of them. It should be half again as large as desired in the finished print so that it can be reduced a third in the camera. Contrasting photographic copy reproduces better than soft photographs do. Type proofs should be clean and sharp and pulled from new type if possible.

For letterpress, photographic copy should be carefully

Color Appeal



WEAK



STRONG

Both of these blues came out of the same can. One was printed with correct makeready and a right impression of ink. The other was weakly printed. Under competition, these two colors would rank one hundred per cent and zero per cent, respectively, judged side by side.

One of these orange toners was printed with proper makeready on a clean press. The other was printed under smudgy conditions. Practically every human eye will have the same reaction to the two results—the one cheerful and one repellent.



CLEAN



DIRTY

Color Legibility

Legibility is an important factor in many types of printing. To solve the problem effectively scientific facts must be carefully weighed against human vision.

White on black also offers good contrast.

Legibility is an important factor in many types of printing. To solve the problem effectively scientific facts must be carefully weighed against human vision.

Where prolonged attention is given to the printed word, black on white is the best of all the color combinations.

Legibility is an important factor in many types of printing. To solve the problem effectively scientific facts must be carefully weighed against human vision.

Where reading conditions involve brilliant light, black on ivory or cream is desirable.

LOOK

Black on yellow is the most legible of all the possible color combinations

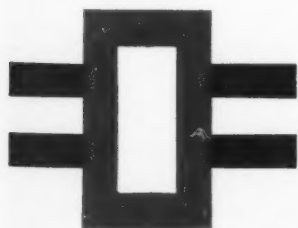
LOOK

Red on white ranks third in color attention value, and blue on white, fourth

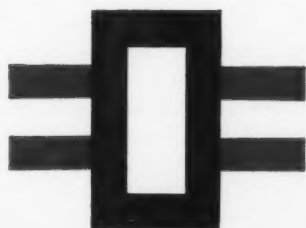
LOOK

White on blue ranks fifth, and black on white sixth in color legibility.

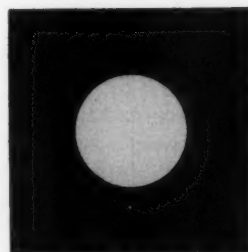
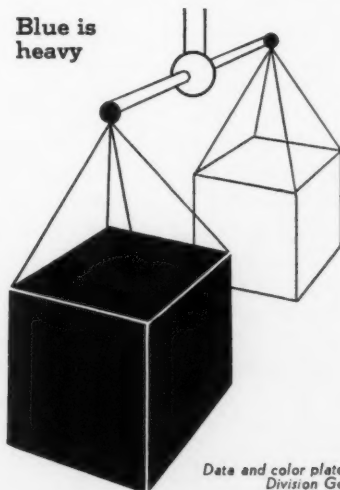
Color Appearance



Red is near



Blue is heavy



Yellow is large



Data and color plates courtesy Eagle Printing Ink Co., Division General Printing Ink Corp.

selected for clarity and sharpness. The photo-engraver is practically helpless in trying to reproduce from poor copy. The camera eye is relentless in picking up defects, and a few dollars spent in retouching by an artist will often more than compensate the package for the expense involved. Avoid gray, non-contrasting shots because the screen of a halftone tends to gray a subject.

Art work and lettering should be firm, sharp and clean. Fuzzy lines should be eliminated by the artist because while the engraver can do it, the process is usually more costly. If possible, try to include the type in the plate; if not, the electro should include type. To be on the safe side, always send the working dummy to the engraver so that he will know what it is all about. Avoid fine delicate type, especially serif types, for reverse plates (in which copy appears white on black background).

The most desirable copy is furnished all in one piece and is done in the same medium throughout. In other words, do not supply one piece of copy in water color and another in oil or Kodachrome and expect to get a perfect reproduction of each. Most houses rate media as follows: transparent water color, opaque water color, oils, pastels. Carbons are satisfactory if they are in register. Kodachromes are excellent if the shop has had experience with them. Colored photographs are usually the least desirable.

Background tints or solids in gravure should be made with colored papers. Variations in air-brush or other means of laying in color, while not apparent to the eye come up with discouraging results in the final print. The best method is to have the tint "flushed in" by the gravure printer.

Legibility of color

Because legibility is an important factor in the success of a package, the following notes based on practical, scientific research are of value.

The most legible of all color combinations is black on yellow. White tends to blur, particularly in strong light, because of aberration in vision which scatters the bluish rays of light. In addition it lacks the attention value of pure spectral hues. Next to black on yellow comes green on white, then red on white, blue on white, white on blue, black on white, red on yellow. For fairly dim illuminations, typical of those found in retail stores, generally light packages are superior to dark ones for high visibility. This is because the deeper colors tend to recede into their environment and be inconspicuous.

Illusions

Bearing on the package are several illusions. Light areas will appear considerably larger in size than dark areas. This is because the light area, focused on the retina of the eye, tends to create an active rather than a passive image. Its edge tends to spread out like water on a blotter, thereby giving the light color increased dimensions. According to research the largest appearing color is yellow, then white, red, green, and blue, with black the smallest of all.

In a similar way, bright and pale colors will seem light

in weight, while deep colors will seem heavy. Generally, the light and warm hues will tend to advance and appear nearer, while the cool and deep colors will tend to retire. The reason for this is that the lens of the eye grows farsighted when focused on rays at the red end of the spectrum and nearsighted when focused on rays at the violet end. The neutral point is in the yellow region.

Color clarity

Printing inks as well as paper stocks are of two main textures: (1) opaque and matt; (2) transparent and smooth. Brilliance of color generally is assured if the

TABLE I. EFFECT OF INKS ON COLORED STOCKS

Stock	Good Colored Inks	Poor Colored Inks
Yellow	Red, warm green, orange, brown. Deep blue or violet may neutralize favorably to a deep black	Blue will turn olive. Purple will turn brownish. Cool greens turn grayish
Red	Red, opaque yellow, opaque orange, maroon, warm purple. Deep blue and purple may form black	Green will turn brownish. Blue will turn muddy. Yellow, if not opaque, will wash out
Orange	Red, rich orange, brown. Deep intense blue or purple may form black	Yellow will wash out. Blue will turn brownish. Green will turn olive
Green	Deep green, blue, violet, opaque yellow	Red will turn muddy. Orange will turn olive. Purple will turn dull
Blue	Deep blue, green, purple	Red will turn dull. Orange will turn muddy. Yellow will turn olive

texture of the ink is like the texture of the stock. With dull-finish boards and papers, a dull-finish ink will appear richest. Where for purposes of protection a varnish is applied, the matt appearance will largely disappear and the colors will grow deeper and shinier. With finished papers and more shiny inks, there will be good clarity. All colors will deepen if coated with varnish.

With some respect paid to the above facts, the unkempt appearance of many containers may be overcome. Mottled, splotchy surfaces often result from the inks being only partially absorbed by a paper stock. If the inks are shiny and the stock dull, the result will naturally be poor. To assure a good, clean finish one of two things may be done: (1) On a dull, absorbent stock, specify inks that are also dull. The all-over effect will be consistent. (2) If basic inks and stock match in texture, an all-over application of varnish will affect them uniformly. Again the effect will be consistent. However, if shiny inks are used on dull stocks, a varnish coating will emphasize the gloss of the ink, but do little to improve the stock, and the container may thus tend to appear shoddy. Shiny inks on finished and enameled stocks rarely cause trouble, with or without varnish.

Good clarity of color is in constant demand, for such effects have the greatest human appeal. Ordinarily, clean, white stocks print best with transparent inks. Such inks reflect light from the surface of the stock through the ink film and, therefore, have a luminous beauty. On stocks that are grayer or yellower in tone, or thick in texture, the transparent ink will not be at its best. Here an opaque ink is desired—one that will hide the stock and reflect light from its surface rather than

penetrate into it. Thus a transparent ink may be quite beautiful on coated stock, but grayish and dull on uncoated. Conversely, an opaque ink may glisten brightly on dull stock, but appear thick and dim on shiny stock unless it is formulated to dry with a high gloss similar to that of the board or paper.

Color mixture

There are three primary colors in printing ink: red, yellow, blue. Toners of these three hues, in various shades, will form most other colors either in actual mixture or in screen combinations.

Where one ink is printed over another or on a colored stock, the result will be good or bad depending on whether the colors are closely related or complementary. No printing ink is absolutely opaque. Therefore, complete coverage cannot be expected. The package designer should study Table 1 as a practical guide to color effects obtained, both on colored stocks and from overlapping inks.

Ink textures

Beauty of color in an ink implies not only the choice out of the spectrum, but also consideration of its texture. A red ink, for example, may be specified as (1) ordinary transparent, (2) ordinary opaque, (3) bronze red (with metallic top tone), (4) dull-set (to have the appearance of a matt surface), (5) high gloss, (6) silversheen. In each case red will be seen, but its finish will differ. Each particular texture has its appropriate beauty. The dull-set ink, for example, lets the vehicle anchor into the stock, thus holding the pigment on the surface and reflecting light almost equally from all angles, without shine. The glossy ink, vehicle and all, dries on the surface into a hard, lustrous film which reflects light more like glass or a highly polished surface. The silversheen ink combines a colored toner with an aluminum powder and has a beautiful finish which changes in appearance when viewed from different angles.

Color effects on metals, plastics, glassine, flint and pyroxylin coated papers, foils, waxed papers, cotton bags, glass, cellophane, etc., generally require specially formulated inks. Since such colors are ordinarily designed to dry on the surface of the material a wide choice of textures is not possible.

Technical aspects

One of the important problems in the printing of packages for foodstuffs, or other commodities with delicate odor or flavor, is that of off-odors caused by the printing ink. These odors or flavors are usually in the vehicles for the printing ink as a result of chemical reaction during drying. In printing packages of this sort, extreme care should be taken, because it is quite possible to compound inks so free from objectionable odor that they will not affect the product deleteriously. Recently, by use of some of the newer synthetic materials, it has been possible to formulate inks that are entirely free from objectionable odor. For various reasons these inks are not adaptable to all cases, but they should certainly be con-

sidered where odor or flavor is so important that one can afford to go to any lengths to preserve its quality.

Incidentally, it should be noted that ink is not the only offender in respect to odor and flavor. Other components of the package, such as paper, adhesives, closures—anything that in any way can come in contact with a perishable article—should be carefully checked.

In a few cases it may be desirable to add an odor to the ink, not to cover objectionable odors, but for some specific purpose. In general, this idea has not been particularly successful because of loss of the odoriferous principles by evaporation.

In the case of package inserts, the selection of printing ink is of the utmost importance. Here the inks must be not only free from any deleterious odor or flavor, but also not affected in any way by the contents of the package. Neither are they permitted to contain any poisonous ingredients, if the contents of the package are to be used for food or in any way in contact with the body. Each particular package must be carefully studied. In general, inks must resist oil and moisture, and, occasionally, abrasive action. The essential oils used as perfumes and food flavors are particularly active solvents for ink vehicles. In some cases, such as dried cereals, there is a surprising amount of abrasive effect during shipping.

When cotton bags are used as containers it is a great advantage if the printing inks can be readily removed by washing. It is common practice, especially in the rural communities, to realize the heavy bags which come in as containers for flour, animal feeds and other farm products, as a source of strong cotton cloth, particularly for dish towels, even as garments. Here it is essential that the printing ink be completely removed by ordinary washing. Such inks are readily available if specified.

Because many packages are designed specifically for their attractiveness in displays, and hence will be freely exposed to light in windows, on counters, presentations, and on store shelves, the printing inks used on packages must be sunfast. The package producer, therefore, must be sure that the printing inks which he has purchased are well chosen, so that his package will not look dull and dingy after exposure in the retail store window.

As it begins to play an increasingly important function in preserving its contents against gain or loss of moisture or flavoring and other unwelcome changes, the package becomes increasingly complex in production. It is essential, therefore, that printing inks be considered in terms of plant procedure. For instance, if the package is to be coated with a moisture-proof lacquer, special care must be taken both with the inks and in the scheduling of work from printing press to lacquer machine, or the lacquers will not adhere properly to the printed areas. Likewise when ordinary coated or uncoated paper is replaced by plastic sheet materials, metallic foil, coated paper of unusual properties or lacquered paper, it will inevitably mean that the ink, too, must be changed to suit these new materials. Further, one frequently finds that it is impossible to use the same printing machinery, and hence the whole process of package fabrication is seriously altered.

Color Standards—a Check List

COLOR standardization is an important problem. The difficulty of describing colors with words, of maintaining records and notations, of getting industry-wide acceptance of uniform color standards—these are all vital to modern business and science.

In an effort to bring together a summary of progress and accomplishment in this field, this convenient check-list is presented. All available data have been brought together for permanent record and reference.

American Colorist: Designed by Faber Birren and widely used in horticulture, art and industry. Charts contain over 500 samples. (One of the most inexpensive color systems ever published.) The Crimson Press, Westport, Conn.

American Standards Association: An important recent standard for color identification is that issued by American Standards Association, New York, "Specification and Description of Color," Z44-1942. Approved by a number of associations and manufacturers, it recommends the use of the Recording Spectrophotometer, the Munsell System, and the Inter-Society Color Council method of designation.

Artists' Oil Paints: Minimum standards to assure satisfactory color, working qualities and permanence in oil paints used by artists. Adapted by a conference of manufacturers, distributors and users. Commercial Standard, CS98-42, U. S. Department of Commerce, National Bureau of Standards, Washington.

Bathroom Accessories: A group of 7 colors for bathroom accessories: white, bath green, orchid, ivory, maize, bath blue, royal blue. Accepted by the National Retail Dry Goods Assn. and approved by a conference of manufacturers, distributors and users. Commercial Standard, CS63-38, U. S. Department of Commerce, National Bureau of Standards, Washington.

British Colour Council: A dictionary of 180 samples of dyed silk, used and accepted by British industry to standardize color names. Published in London.

Camouflage Colors: A series of nine colors used as standards by the Army. Specification T-1213, Supplement A and B, U. S. Army, Corps of Engineers, Washington.

Cast Stone: A group of 14 colors for the finish of cast stone. Recommended Commercial Standard, TS-2126, U. S. Department of Commerce, National Bureau of Standards, Washington.

Color Kit: Designed by Faber Birren. Color identification is achieved through the use of disks and a mechanical spinning device. Numerical proportions are developed for all notations. The Crimson Press, Westport, Conn.

Dictionary of Color: Written by A. Maerz and M. Rea Paul. Shows over 7000 samples, with color names based on historical origins and current usage. Published by McGraw-Hill Book Co., New York.

Drugs: U. S. Pharmacopoeia and the National Formulary designate the colors of drugs by name in their monographs. The National Formulary uses the ISCC-NBS system of color designations and about one-third of the monographs in the current issue of the U. S. Pharmacopoeia uses them. Work is planned which will put the remaining monographs on this system. Description of the system and of the methods of applying it to drugs and chemicals are given in: Method of Designating Colors, RP1239; Instructions for Determining the Color Names for Drugs and Chemicals, N. F. Bulletin, 8, 359 (1940); Central Notations for ISCC-NBS Color Names, Journal of the American Optical Society, 31, 587 (1941); Specification and Description of Color, ASTM Bulletin, p. 19 (December, 1942).

Fischer Color Chart: A chart of 108 colors for the description and identification of flowers. New England Gladiolus Society, Norwood, Mass.

Flag of the United States: Scientific definitions of the red, white, blue approved by all departments of the Government. Section IV, Federal Standard Stock Catalog, Specification TT-C-591, July 3, 1934, Superintendent of Documents, Washington.

Foundry Patterns on Wood: Standard system of marking wood foundry patterns, using black, yellow and red. Accepted by various associations. Commercial Standards, CS19-32, U. S. Department of Commerce, National Bureau of Standards, Washington.

Gas Masks: A system to identify respirators and gas masks in industry. The colors used are white, black, green, blue, yellow, brown, red. Safe Practices Pamphlet No. 64, National Safety Council, Chicago.

Historical Color Guide: A comprehensive review of traditional and period colors. Contains 146 specimens. Written by Elizabeth Burris-Meyer. William Helburn, Inc., New York.

Horticultural Colour Charts: Published under the direction of the British Colour Council, London. Two volumes, containing about 800 color samples. Used for standardization in horticulture and industry.

Inter-Society Color Council: An effort to develop a standard designation for colors, using words commonly understood. Approved by various associations and applicable to widespread use in science, art and industry. Research Paper RP1239, U. S. Department of Commerce, National Bureau of Standards, Washington.

Kitchen Accessories: A group of 6 colors for kitchen accessories: white, kitchen-green, ivory, delphinium blue, royal blue, red. Accepted by the National Retail Dry Goods Assn. and approved by a conference of manufacturers, distributors and users. Commercial Standard, CS62-38, U. S. Department of Commerce, National Bureau of Standards, Washington.

Munsell: The Munsell Book of Color is a widely accepted system of color identification in the United States. Present edition contains some 400 samples. New and enlarged edition is in preparation. Published by Munsell Color Co., Baltimore.

Ostwald: The Ostwald system of color, widely used in Europe, England and America, contains over 600 samples. Two series of standards are available, one produced by Winsor & Newton of London, and the other by Container Corporation of America, Chicago.

Piping Systems: Schemes for the uniform identification of piping systems in industry. Red for fire protection; yellow (or orange) for dangerous materials; green (white, black or gray) for safe materials; blue for protective materials; purple for valuable materials. Approved by American Standards Assn., A13-1928.

Poisons, Explosives, Gases: The Interstate Commerce Commission recognizes and insists upon special labels for shipment of gases, inflammable liquids, explosives, acids, etc. The colors generally used are white, black, red, yellow, blue, green.

Process Colors: Adopted (1927) by the Standardization Committee of the American Institute of Graphic Arts and approved by the American Assn. of Advertising Agencies and the National Assn. of Advertisers. Recommended standards for process red, yellow, blue, black.

Ridgway: The most renowned historical work in America. Contains about 1,000 samples, each identified by name. Widely used by archaeologists and naturalists. Published by Robert Ridgway, Washington, 1912.

Sanitary Ware: Standard colors for plumbing fixtures and allied products made of vitreous china, enameled iron, etc. The colors are green, orchid, ivory, blue, light brown, black. Adopted by a conference of producers, distributors and users. Commercial Standard, CS30-31, U. S. Department of Commerce, National Bureau of Standards, Washington.

School Bus Chrome: Standard yellow adopted for school buses and approved by representatives of the 48 State Departments of Education. International Textbook Co., Scranton, Pa.

School Furniture: Standard colors for school furniture as adopted by a conference of producers, distributors and buyers of school equipment. Simplified Practice Recommendation, R111-30, U. S. Department of Commerce, National Bureau of Standards, Washington.

Sedimentary Rocks: Goldman and Merwin Color Chart, showing 114 colors for the description of sedimentary rocks. Division of Geology and Geography, National Research Council, Washington.

Signal Glasses: Scientific description of colors used in signal glasses: red, yellow, green, blue, purple, lunar white. Signal Section Specification, 69-35, American Assn. of Railroads.

Soil Colors: A showing of 54 different colors of soil. Miscellaneous Publication No. 425, U. S. Department of Agriculture, Washington.

Standard Color Card of America (9th Edition): The master color card for all color-using industries. It contains 216 standard colors and includes many official colors standardized for various purposes by the

United States Government, such as colors for uniforms and other government standards.

Traffic Devices: Standard practices in the use of color on streets and highways—traffic lights, signs, curb, markings, etc. American Assn. of State Highway Officials, Washington.

U. S. Army Color Card: Army colors standardized for the different arms and services and approved by the Quartermaster General. Issued by Textile Color Card Association, New York.

U. S. Army, General Paint Specifications: A showing of 24 colors used by the Army in the purchase of paint and related materials. Supplement to No. 3-1, issued by the Quartermaster General, Washington.

U. S. Army-Navy Aircraft Standards: A group of 15 colors used in the purchase of finishing materials for aircraft. Issued by the Bureau of Aeronautics, Navy Department, Washington.

U. S. Ribbon for Service Medals: General color specifications for the ribbons used on medals and decorations. U. S. Army, Specification 7-3B, Washington.

Color Photography in Wartime

by Clayton Whitehill

COLOR photography's scope is limited by the same win-the-war-first restrictions as other graphic arts techniques. Film and flash-bulbs are scarce: both are composed of essential materials. Film production depends on the availability of plastics; flash-bulbs use war-needed metals. Civilian supplies are short 75 per cent—at least. This shortage was anticipated by photographers in 1942 and studio stocks are fairly large.

Kodachrome and Agfa sheet film in professional sizes now belong entirely to the army. Studios using these makes are, in some instances, cutting their film on hand to half or quarter the size to fit smaller cameras. The resulting transparencies are used for guides in hand-coloring black and white prints. Photoflash bulbs are used only when absolutely necessary. High-power continuous lighting is the alternative.

Materials for chromatone, carbonyl and wash-off relief methods are available, but in reduced quantities. Studios making color prints are therefore not seriously handicapped at present. Advertising schedules requiring color photography are progressing as planned. However, agency art departments are prepared to resume larger purchases of drawings should the photographic material scarcities increase seriously.

On the surface, the situation does not seem immediately desperate. Where paper prints are required, color photographs may be supplied. Where the photographic situation makes color transparencies necessary, as in outdoor snapshots or certain studio action shots, there isn't any material available except under the highest priority rating. Advertising illustration does not enjoy this privilege. If the war lasts another year, most present civilian stocks of all color film types will be exhausted either through use or deterioration.

The technical status of color photography as of Pearl Harbor was relatively static. Increase in processing

speeds for transparencies had been accomplished by Eastman and Agfa. Individual photo-engravers had developed techniques that were evolutionary but not revolutionary. The two schools of thought, transparency vs. paper prints were still opposed—even antagonistic. The transparency school argued that the purely photographic method was faithful, cheaper and faster. The paper-print school offered color fidelity and selection as its chief defense; insisting that the brilliancy of a transparency overshines accuracy of color. The engraver's preference for paper-prints (despite higher prices chargeable for engravings made from transparencies) was a supporting argument. Today, the controversy remains. Experimentation must be postponed until victory.

Post-war predictions are possible. Greater efficiency in paper printing will be the first accomplishment. Color photograph printing will become a major profession. When the color photograph can be printed almost as easily as a black and white, when lighting equipment attains an even higher degree of simplification and compactness—the graphic artist will have a convenient medium with endless possibilities.

Future developments in the transparency field may incline toward the Kodachrome print—an enlargement of a Kodachrome transparency on an opaque plastic base. While this print must be processed by the manufacturer, its advantages in size and visibility under reflected light are obvious. Probably, the photographer will some day be able to make his own color enlargements from his own transparencies. This method might conceivably supplant paper printing. It is to be hoped that all research in color photography will aim at making the medium as easy to control by the artist as black and white photography.

Color and Wartime Packaging

by John F. Haggerty

AMERICAN business, in its second year of war, is now in a position to evaluate the future against the background of the hectic trial-and-error period of 1942.

I doubt if there is anyone in the printing, publishing or advertising industry who does not recall with a shudder those turbulent rumor-jammed days immediately following Pearl Harbor. Those days when the next order from Washington was going to limit all printing to black and white, drastically slice the amount of metal available to engravers and electrotypers, curtail paper manufacture to the barest minimum, eliminate coated stock entirely and, lastly, abolish all but prime containers.

Now let us see where we stand fourteen months later, fourteen months during which our war industries siphoned off enough material to manufacture 48,000 planes, 56,000 combat vehicles and enough incidental armament to prompt President Roosevelt to the simple, but confident, statement, "I think the Arsenal of Democracy is making good."

A recent survey of 116 important American industries conducted by the Printing and Advertising Clinic of the General Printing Ink Corp. on matters pertinent to the graphic arts, revealed this interesting information:

To the question, "Have you experienced any difficulty in securing paper, plates, inks, etc?"

86% of the companies said "No."

13.8% gave no answer.

No one said yes!

To the question, "Will you use more or less color?"

70.7% will use the same as before.

11.2% will use more color.

7.8% will use less color.

10.3% gave no answer.

From this we see that 81.9% of large users of color will endeavor to use as much, or more, color as heretofore. What is their outlook for supply?

Among the chemicals vital to both the ink industry and war production are the following:

Naphthalene: Used in practically all red pigments, also for high explosives and synthetic resins used in the manufacture of paints for ships, tanks and planes.

Phenol: Used in process reds, disinfectants, medicines and high explosives.

Toluol: Used in permanent brilliant reds, and in war production it is the basic material of T.N.T.

Benzine: The source of peacock blue, Persian orange, reflex blue, para red, hansa yellow, transparent yellow, green and violet lakes. This vitally important chemical is used in aviation gas and synthetic rubber.

The metal situation is hardly less favorable. The two critical metals used are tungsten and chromium.

Tungsten formerly imported from China is now being received from South America. This element is used pri-

marily in tool steel, armor plate and armor piercing projectiles. The amount of tungsten used in inks is small, but vital to the manufacture of transparent lake inks.

Chromium has been the glamour metal of the ink industry, from a standpoint of publicity, since the war began. One of the first Government orders limiting the production of dry color was directed at the amount of chromite ore available for conversion into bichromate of soda. Unable to obtain necessary stocks of this basic material, pigment manufacturers could not supply consumers with the quantities of dry chrome yellow normally required.

Subsequently the shortage of chromium for the steel industry was traced, not to an insufficient supply of chromite ore, but to insufficient conversion capacity in the steel industry. When this became evident the chrome order was modified and at present the market can supply current needs.

Previously 95% of this metal came from abroad, notably Turkey and the Southwest Pacific. Today deposits are being worked and developed in Alaska, Montana, California and other western states. As an ink source, chromium is essential to chrome yellow whose production last year soared to an estimated 44 million pounds, largest of any dry pigment.

In war production it, also, is used in the manufacture of chrome steel, armor plate, armor-piercing shells, stainless steel and non-corrosive military equipment. As a further barometer of the availability of color for printing, consider that in 1914 the United States produced less than ten per cent of dyes consumed. In 1940 we produced over 95 per cent of the total consumption.

At this time a sufficiently wide range of color pigments is available to make possible an adequate supply of most colors for the graphic arts. Moreover, if it should become necessary to stop production of any specific pigment or group of pigments because of diversion to war industry of essential ingredients, a change-over to other shades would today meet with a highly conditioned customer acceptance. Merchandisers may, with impunity, almost scrap their customer identity entirely, provided they give as a reason—the war.

A recent example is the large cigarette manufacturer who sent one of his time-honored identifying marks "off to war." No one asked "why?" Everyone assumed that the color involved was not available and that this was merely the forerunner of a huge conversion to less critical materials in the advertising and merchandising fields, even though this was not the case.

These conversions will most assuredly be made whenever and wherever it becomes necessary to divert critical supplies to war industries.

That time has not come. Use of color definitely does not imply a breach of patriotism.

Today's Packaging Problems Demand Proven Inks!

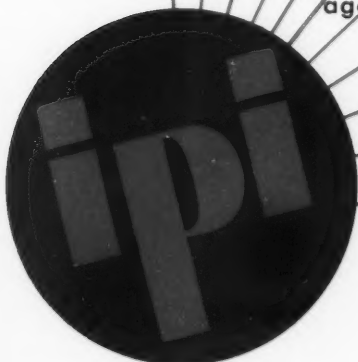
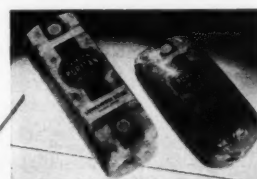
More All-America
Winners Use Inks by IPI

Now more than ever packaging problems demand proven printing inks. Each one of these All-America winners are among those printed with IPI inks. A survey of All-America award winners has shown that in 1942 as in years past, more of these prize packages were printed with IPI inks than with the inks of any other manufacturer. IPI has maintained this leadership in the field of package printing inks year after year. Its extensive research facilities have kept pace with the problems growing out of conversion packaging to meet wartime needs.

Now more than ever this research program is vitally important. A revolution is taking place in the field of packaging. Changes in types of packaging are shifting whole markets into new channels. A large section of the packaging business is moving from the metal decorator to the paper box and container manufacturer.

"Keep in Touch with IPI" is a policy which leading packagers and package printers have followed. During a wartime economy this suggestion is particularly timely.

Remember that IPI laboratory technicians are working for you—working to meet the demands of the packaging industry under present conditions. International Printing Ink, Division of Interchemical Corporation, 75 Varick Street, New York City, New York.



Roll Leaf Hot Stamping and Embossing

by Alfred A. Morse

THE roll leaf hot stamping process is a method of marking or embossing products made of plastic, wood, hard rubber, fibre, paper, cloth, etc. Under some conditions it is even possible so to mark metal surfaces which are heavily coated with enamel or lacquer.

The roll leaf hot stamping process utilizes the best features of several other processes with none of their disadvantages. It is like engraving, in that impressions are usually made below the surface of the material being marked. It is like letterpress printing, in that pigments are used as well as genuine and imitation gold and because the work can be done in some cases on a printing press equipped with a roll leaf feeding attachment. In one single press operation the roll leaf hot stamping process combines the operations of printing, bronzing and embossing on thin materials such as cover stock, letterheads, cards, etc. With this process it is possible to emboss raised designs.

Under wartime conditions there is a large field of application in marking, for identification purposes, aircraft, marine and ordnance items.

In order to do roll leaf hot stamping and embossing three things are required: A stamping press, a roll of stamping foil and a brass or steel die, or type. Presses used can be classified under three varieties: (1) platen presses such as Chandler and Price, Brandtjen and Kluge, and Colt's Armory presses; (2) bookbinders' presses of the Sheridan and Seybold types; (3) specially designed upright presses such as the Peerless. The Peerless press has been specially designed for roll leaf hot stamping and is available in rotary models as well as in the upright models more generally used. Presses can be designed for hand operation, semi-automatic or fully automatic operation.

Very little makeready is required for ordinary flat stamping such as lettering or open trade mark designs. Where embossing is required, makeready is cut on the bed of the press. A roll of stamping foil of the required width feeds across the face of a heated die attached to an electric heating plate.

Since dry colors are used exclusively, no drying time is necessary. The stamped articles can be packed immediately or used in subsequent manufacturing operations. The roll leaf comes in several shades of genuine gold, imitation gold and silver, and a wide range of colors. Two or more colors can be used at one time if they do not interfere with each other in the design. Roll leaf is available in widths up to 24 inches in 1/8-inch units. Roll leaf is usually supplied in rolls 200 feet long but can be had in special lengths if desired. Thousands of impressions can be obtained from the relatively inexpensive steel or brass dies or type.

Applications

Because of the varied characteristics of different plastics, marking or decorating such articles with roll leaf is sometimes difficult. Special presses have been developed for marking plastics, presses to operate under high pressure using steel dies. Articles of wood, on the other hand, offer no difficulty, whether the surface is flat or curved.

Another application is the imprinting of cartons. Ordinarily, quantities required must be estimated in advance and large stocks of folded and pasted blanks must be carried at all times by the manufacturer. By the roll leaf hot stamping process, this is all avoided. The manufacturer buys only one type of blank in each size. As special imprinting is needed, a supply of the folded and pasted blanks is placed in the hopper on a carton-imprinting press, stamped automatically and ejected. Since no time is required for drying, the stamped blanks can be used immediately in packaging operations.

Box tops and wraps

In stamping box tops and wraps the printing is first done on a platen press and the printed blanks are then fed into a press equipped with a roll leaf feeding attachment and heating plate. These attachments are available for platen presses of the Chandler and Price or Brandtjen and Kluge type. A brass die is needed for the part to be embossed with roll leaf. This die not only releases the foil but also embosses the surface of the cover stock in the same press operation.

Stamping with roll leaf affords permanence of brand on hard-to-mark surfaces and textures.



Production Considerations in Wartime

by H. F. Brownell

WAR conditions have greatly altered the nature of various packages with restrictions on the use of metals causing the greatest number of changes. This has brought up the question of the selection of the proper substitute container which will pass through the existing packaging machinery with the least possible alteration to existing equipment.

Packagers who are able to secure from manufacturers the same shape package they formerly used are indeed fortunate. To the packaging engineer this concerns packages which have the length, width and thickness of the substitute package which obtained in the original, because the machinery he has, is, for the most part, adapted to handle one combination only. This is particularly true in the case of high-speed, fully automatic machinery although other types of equipment often permit tolerance on one or two of the dimensions.

The primary consideration, of course, is—will the container selected move along the various conveyors without jamming or tipping over? Will it go through the machine to receive its charge of the product? This is generally accomplished by means of star-wheels or rotating tables, and if the present machine will not accept the new container, alteration or complete rebuilding of some parts may be necessary to bring the package to the proper point at which it will receive its load without damaging the container. The same problem holds true as to the rest of the machine via the conveyor belt and all succeeding operations. The newly selected package must be adaptable to the present machinery or the machinery must be readily changed to accept the new package.

The new package usually has a new cover or closure, and this can seldom be adapted to the closing mechanism of the original package, with the result that very often closing operations will have to be performed by hand. So it is the job of the packaging engineer to consider these points and choose a package which, after meeting the requirements of the contents, will require as few changes as possible in the machinery. Still further along the production line, the label must be attached—if it has not been affixed by the container manufacturer. Frequently, however, labeling machinery can be easily altered to accept a new size or shape of container without too much difficulty.

The production facilities of the packaging machinery people have, for the most part, been converted to war work and they have no time for the creation of new parts for their own base machines. Loaded with high priority work for weeks ahead, they often require priority ratings before accepting what normally would be replacement orders. The result is that the packager has had to do a great deal of improvising with the talent and the facilities in his own plant.

Producers of large volume items have been hard hit. War industry and the armed forces have taken a great many of their employees while at the same time packaging changes require more hand operators. They are forced to continue, obviously, with a reduced staff. Plants where there always was a larger percentage of hand work apparently adapt themselves more easily. In general, the war has made substitute packages more expensive and more difficult to produce. Many packers, therefore, are unwilling to make permanent changes in their machinery that cannot be reconverted to the original package after the war.

Production requirements are still a paramount consideration—the most efficient working of the package through the plant. Appearance is not the principal consideration, for often it is found that extra costs have been incurred which could have been prevented by making some minor change in the structure or design of some detail of the package. For instance, a circular label may have been selected: Since type must be read right side up in a straight line, the label must be applied in only one possible position and unless there is a provision for holding the label in its box, the label might be applied in any position, requiring extra inspection and hand work to see that proper register is obtained.

Floor space can be conserved, for instance, by the selection of collapsible boxes rather than set-up type, and telescope containers also occupy less room than others. In some industries containers, packing material, corrugated cases, etc., are each purchased from different concerns, requiring multiple storage space, while in other industries, such as the bottle industry, one source of supply provides the entire required unit.

In some industries containers must be bought from one concern, a special type of packing material from another, and corrugated cases from a third, each of which requires a certain volume of space. It is much better if all these items can be obtained from one source of supply, as in the bottle industry, for instance, where the bottles are shipped with packing, ready for final distribution.

Objects of production

1. To assemble in the most efficient manner possible:

- (a) Space is at a premium in most factories and a package should be produced in the least possible amount of floor space.
- (b) Any good production man wants as many units as possible pouring each hour out of a given line.
- (c) All supplies should be immediately available when needed.
- (d) Supplies should be on the same floor with the assembly or accessible with a minimum amount of handling.
- (e) Every production man's dream is straight-line

production. This does not necessarily mean starting at one end of the room and finishing at the other, but it does mean the minimum amount of handling and breaks in the line. Production can be in "L" shape or "U" shape and still be straight-line production as long as breaks or bottlenecks are avoided.

2. To produce at the lowest possible cost:

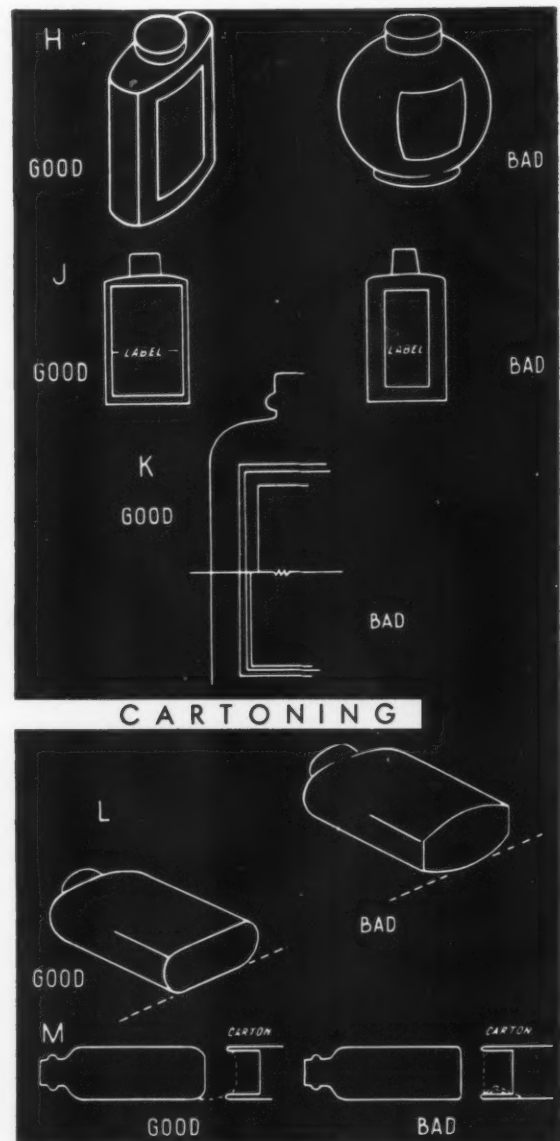
- (a) The production man's basic thought is to be able to assemble a particular package with the least possible amount of labor.
- (b) Waste should be reduced to the minimum.

(c) Just as important as an even flow of raw material to the packaging lines, is the smooth disposal of finished goods coming from that line. This can be done by chutes or skids on platform trucks, etc.

3. To anticipate future ways of handling the package:

- (a) One never knows just what the result in sales will be when a familiar package is changed or replaced by a new one. The production man is mindful of this and in his first planning tries to think of what would be necessary to produce his package should the conditions change.

Good and bad elements in design considered from a production viewpoint. A. Bottles cannot tip. B. Single point of contact causes breakage. C. High single point of contact causes tipping. D. Oval shapes tend to turn and wedge; rectangular or rounds do not. E-F-G. Good design avoids necessity for hand-locating of packages prior to labeling. H. A simple curve presents no labeling trouble; a compound curve offers great difficulties. J-K. Label should be easy to spot and slight variations should not be noticeable. L. A flat non-rockable side is desirable. M. A good radius on the container base helps it to slide easily and smoothly over the carton edge.



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A production man's bill of specifications

Whenever a new package is created and production is being considered, the production man naturally breaks this package down into its component parts and makes a study of each to see how it will go through his line and whether additional machinery will be required.

Choice of container: Of all the components of a package, the container represents the starting point and the one point about which all others revolve, so it is extremely important to consider this well and choose the proper one. The following factors are of primary importance to production:

- (a) No part of the container should be deceptive in appearance.
- (b) It should be the proper size and shape from the consumer's point of view.
- (c) It should be of the proper size and shape to move freely along the conveyor.
- (d) It should not pile up or jam anywhere along the production lines.
- (e) It should be able to go around curves or be pushed without breaking, chipping or mechanical difficulties.
- (f) The opening should be large enough for ease of filling.
- (g) The opening should be convenient for removal of the contents.
- (h) It should have the proper label space available.
- (i) It should be constructed sturdily to withstand traffic conditions and be free from breakable parts.
- (j) It should have no feature which would prevent its being assembled by a fully automatic machine.

Choice of label: When a production man sees a label he studies it carefully in its relation to the rest of the package and with the following thoughts in mind:

- (a) Oddly shaped or freakish labels should be avoided.
- (b) The label should fit properly into the label space on the container.
- (c) The back of the label should be of such quality that it will adhere properly to the container.
- (d) Consideration of a label implies also the adhesive used with it, because the product has to be stored in hot places, cold places, damp places and dry places and it is not unusual for certain types of adhesive to crystallize or become damp and so allow the label to come away from the package. Different types of adhesive are required for different types of supplies; the same type cannot be used for a tin can as for glass, for a varnished surface or for sealing corrugated cases.
- (e) It must be possible to apply it by machinery.

Choice of closure: The following requirements come into a production man's mind:

- (a) The closure should fit the container properly.
- (b) It should make a tight seal, effective over a long period of time.
- (c) The re-sealing features should be satisfactory from a consumer's point of view.
- (d) The liner should be of such quality as to withstand deterioration.
- (e) The liner should not contaminate the product in the container.
- (f) There should be no feature of the closure which would prevent its being applied and tightened by the usual type of closure machine.

Choice of carton and wrapping material: The following details must be carefully worked out:

- (a) The carton itself should not be deceptive in size but should fit the container it holds.
- (b) The carton should be sufficiently heavy to withstand abuse in traffic.
- (c) All details of construction of the carton should be such that it can be run on the available cartoning machines.
- (d) The package should be of proper shape and construction to permit wrapping by machinery.
- (e) Wrapping material should be of the correct type and weight for the purpose.
- (f) The right type of adhesive or sealing mechanism should be available for the wrapping material.

Choice of packing material: (a) Packing materials should be selected of the proper quality and type to protect the package on its journey to the ultimate consumer.
(b) The finished package should comply with all Interstate Commerce Commission regulations.

Machinery

When considering a new package, the production man must visualize the assembly in the factory, giving close attention to the machinery involved.

If there are any lines of machinery in the factory which are not employed to their full capacity, the details of construction of this new package should, if possible, be adjusted to the use of this line of equipment.

Practically all sales start small and then expand—sometimes very rapidly—so when the machinery is being considered for the production of any package, it is important to get some idea from the sales department as to future requirements. If there are certain periods of the year when the package may have greater sales than at other times, this calls for peak production.

The matter is complicated by the fact that so many of the machine tool people who formerly furnished their machines for general industries are now very busy with government work and deliveries are delayed six months to a year. Further, the shortage of metals in the industry delays manufacture of whole machines and many parts.

The purchase of additional machinery should be considered on the following two points:

- (a) Tools and equipment are absolutely required to produce some articles of commerce. The manufacture of tablets or pills, or the molding of suppositories is no longer done by hand. The greater speed of production obtained from machines is required to meet the sales demand. The manufacture of many other things would progress very slowly if the operations were done by hand.
- (b) Considering factory costs—that is, how much will be saved—studies should be made to determine the output of a machine. Management should know the exact cost of making each unit or thousand units by hand and then, if the volume is sufficiently large, it is in a position to state whether the expense of buying the equipment will be offset by labor savings. Some businesses feel that if a piece of equipment will pay for itself in labor savings in two years, its purchase is justified. Others feel that the machine should pay for itself through such savings in a shorter time than this.

Container and Package Simplification

by W. E. Braithwaite

TO ASSIST in a wide program to increase efficiency in production, and to conserve materials, the U. S. Department of Commerce, through the National Bureau of Standards, is cooperating with the War Production Board and other agencies of the Government, as well as manufacturers and others interested, in an effort to eliminate excessive or unnecessary types of manufactured products through the expedient of simplification. This program is in continuation of the work carried on by the Division of Simplified Practice of the National Bureau of Standards, since World War I.

In the view of Donald M. Nelson, Chairman of the War Production Board, the elimination of waste and the conserving of materials are as urgent now as they were in 1917 and 1918, when the Conservation Division of the War Industries Board urged manufacturers, distributors and users of all kinds of products to concentrate their attention on attacking waste in all forms.

Considerable emphasis has been placed on the influence of the present war on packaging trends. It is generally accepted that the need for simplification and standardization of containers and packages was never more urgent than now, when, on every side, we face restrictions curbing the types and character of materials which can be used for packaging various products.

Much has been accomplished in the past few years toward effective simplification and standardization in the container and packaging fields through voluntary cooperation. In recent months, a number of container and package simplification programs have been promulgated in mandatory Conservation or Limitation Orders Issued by the War Production Board. As an example, the glass container industry, through the Design and Specifications Committee of the Glass Container Assn. drafted a simplified schedule of recommended sizes and dimensions for a standard or utility line of jars and bottles which require 25 to 30 per cent less glass than that ordinarily required for comparable stock made in the past. Limitation Order L-103 centers around this simplified schedule.

A program which calls for economies through simplification is not new to most container manufacturers and packaging groups. They have discovered that simplification can be accomplished without interfering seriously with sound package design or with progress in the development of proper types of containers and packaging.

Present emergency conditions will undoubtedly have a good effect upon packaging. In the opinion of a number of manufacturers, designers, users and others interested, many packages have been too elaborate and wasteful of material. In many cases future types of containers and packages will not only be more economical, but more appropriate and efficient. This is in

line with a recent request of the Director of Economic Stabilization in which he asked the chairman of the War Production Board to undertake a vigorous program of simplification and standardization of production and distribution to eliminate frills and wasteful practices, thus to clear the way for essential production.

A simplification program is therefore a challenge to both Government and industry in the emergency which confronts the United States at present. The National Bureau of Standards, through its Division of Simplified Practice, is in a position to assist industry to meet the challenge in carrying forward a simplification program as a vital defense activity and as a valuable contribution to post-emergency economy.

The following Simplified Practice Recommendations for containers, packages and packaging materials were developed by the industries concerned and promulgated under the cooperative procedure of the Division of Simplified Practice on a voluntary, cooperative basis. As already pointed out, a number of these recommendations have been used by the War Production Board as a basis for the drafting of mandatory Conservation and Limitation Orders.

Food containers and packages

R10 Milk and Cream Bottles and Bottle Caps (March 1, 1927): Recommends outside dimensions, weight of glass for the quart, pint and half-pint bottles, and a standard diameter and thickness for the paper disc closure.

Many changes have been made in the shapes or dimensions of milk bottles since 1927 and research in the glass container field has made it possible to retain the same strength with a lighter weight of glass in the bottle. Developments in the closure industries have made it necessary for the bottle manufacturers to make certain changes in the standards for neck finishes. These changes have been made gradually. This simplified practice recommendation will be revised as soon as the Design and Specifications Committee of the Glass Container Association has submitted drawings for revised standards.

R42 Paper Bags for Groceries (October 15, 1925): A simplified list of sizes (pounds) and capacities (cubic inches), for self-opening, square and flat bags. 1,580 items, amounting to 25.16 per cent of the sizes formerly listed, were dropped.

R64-30 Folding Boxes for One Pound of Coffee (July 1, 1930): After a survey by representatives of the Paperboard Industries Association and the National Coffee Roasters' Association, two sizes were recommended as standards. 100 different shapes and sizes had been used for the one-pound coffee carton alone. In process of being revised.

R70-42 Salt Packages (May 1, 1927): Revised May 15, 1941, and August 15, 1942. Weight of packages, types of containers recommended for each kind of salt, and unit of pack in shipping container covered in this simplified practice recommendation. Variety in packaging reduced from 72 to 12.

R-91-32 Glass Containers for Preserves, Jellies and Apple Butter (December 15, 1932): Nine standard sizes for preserves (formerly 40); seven standard sizes for jellies (formerly 25); and four standard sizes for apple butter were adopted. A glass container and closure simplification schedule for preserves, jellies and apple butter are being promulgated by WPB Limitation Order L-103 which will require a revision of this recommendation.

R107-31 Glassine Bags (October 14, 1932): List of sizes for flat and square glassine paper bags, reduced from 124 to 26.

R120-40 Ice Cream Brick Molds and Cartons (January 1, 1931): Revised July 1, 1936, and June 30, 1940): One standard mold for 2 gallons of ice cream (formerly 30); two each for the lined and for the unlined machine-filled carton, in both quart and pint sizes. Last revision recommends additional pint carton to fit the ice-tray in household refrigerators. The Containers Division and Food Division of War Production Board issued a voluntary conservation program covering the packaging of direct-fill cartons and cups that takes precedence over this simplified practice recommendation for the duration of the war.

R123-30 Carbonated Beverage Bottles (September 1930): A proposed revision of this simplified practice recommendation before the bottlers and glass container manufacturers for approval.

R131-35 Glass Containers for Mayonnaise and Kindred Products (1931; January 1, 1935): Five sizes adopted. A survey (1939) revealed that 98 per cent of production was packed in these five standard sizes. The Containers Division of War Production Board is preparing a schedule for bottle and closure simplification to be promulgated under Limitation Order L-103. This Simplified Practice Recommendation will be revised after War Production Board Simplification Schedule has been officially announced.

R132-36 Ice Cream Cups and Cup Caps (1932; July 1, 1936): The intermediate and tub shapes in 1/2-pint, pint and quart sizes are recognized standard packages under this recommendation; includes standard diameters for cup caps. The Containers Division of Food Division, of War Production Board, issued a voluntary conservation program covering the packaging of direct-fill cartons and cups that takes precedence over this simplified practice recommendation for the duration of the war.

R148-33 Glass Containers for Cottage Cheese and Sour Cream (January 1, 1933): Standard dimensions for bottles holding 8, 12 and 16 fluid ounces. A proposed revision of this recommendation will be submitted to milk dealers, bottle manufacturers and others interested for acceptance as soon as the Design and Specifications Committee of the Glass Container Assn. furnishes the drawings.

R155-40 Cans for Fruits and Vegetables (1931; 1937; revision current): Lists 39 cylindrical and 2 square shapes of specified dimensions; 19 of these designated for use exclusively with a single commodity, others used with 2 to 57 different designated commodities. See War Production Board Conservation Order M-81, which limits the sizes and use of cans for food products. This and subsequent War Production Board Orders take precedence over the simplified practice recommendation for the duration of the war.

R156-41 Extracted Honey Packages (October 1, 1934; revised in 1937 and again in 1941): Containers Division of War Production Board is preparing a schedule for bottle and closure simplification to be promulgated under Limitation Order L-103. This simplified practice recommendation will be revised after War Production Board Simplification Schedule has been officially announced.

R170-38 Spice Containers (June 15, 1938; revision current): Lists 1, 1 1/4, 1 1/2, 2, 3, 4, 8 and 16-oz. packages for ground spices with maximum and minimum capacities of containers. It has been agreed that the tapped-down volume of spices should show an average of 85 per cent of the initial flow-in filling.

R175-40 Heavy-Duty, Round, Nesting, Paper Food and Beverage Containers and Lids (September 15, 1940): Based on a proposed list of recommended standards covering type, size, shape, weights, etc., developed by the Standards Committee of the Cup and Container Institute, Inc., in cooperation with the Division of Simplified Practice. The Containers Division of War Production Board has issued a voluntary conservation program covering the packaging of direct-fill cartons and cups that takes precedence over this simplified practice recommendation for the duration of the war.

R187-42 Food Trays or Dishes (April 1, 1942): Lists recommended standard stock sizes, capacities, etc., for waxed-paper, molded-wood-pulp, and wood trays.

R193-42 Packages for Shortening, Salad Oil and Cooking Oil (July 1, 1942): Lists the sizes of packages and number of packages in shipping cases.

R196-42 Glass Containers for Green Olives effective November 1, 1942. This recommendation includes a list of twelve sizes of packages in the paragon, tall and standard shapes of bottles. Over 90 types and sizes of containers were used before the adoption of this recommendation.

R197-42 Glass Containers for Maraschino Cherries, effective November 1, 1942. This includes a simplified schedule of 8 standard sizes of packages in the vase and wide-mouth types of jars adopted as standards by the industry. The packers had been using at least 45 different sizes and types of containers before this recommendation was made effective.

Shipping containers

R20-28 Steel Barrels and Drums (January 1, 1928): Lists stock types and capacities of steel barrels and drums.

R135-32 Wooden Butter Tubs (January 1, 1932): Lists standard inside dimensions and over-all length of staves for tubs holding 63 to 64, 33 and 10 pounds.

R146-41 Corrugated and Solid Fibre Boxes for Canned Fruits and Vegetables (January 1, 1933; revised 1938 and again in 1941): Lists standard inside dimensions of boxes based on number and arrangement of 41 accepted standard cans.

R164-36 Tinned-Steel Ice Cream Cans (July 1, 1936): Lists sizes and capacities of stock types (high and low).

R171-38 Wooden Boxes for Canned Fruits and Vegetables (July 1, 1938): In process of being revised to include recommended standard inside dimensions of boxes based on number and arrangement of 41 accepted standard cans.

Folding and set-up boxes and paper bags

The following recommendations were drafted by committees of the National Retail Dry Goods Assn. and interested persons in the supplying industries in cooperation with the Division of Simplified Practice. As a further means of conserving boxboard, the Containers Branch of the War Production Board has promulgated new construction specifications for both set-up and folding boxes as used by retail stores which provide for lighter weight and lower caliper board. The War Production Board specifications should be taken into consideration in connection with these simplified practice recommendations.

R126-31 Set-up Boxes: Lists 75 sizes of containers for all uses in department store (formerly 2,849). Definitions given for kind of board, finish, caliper, packaging, nesting and construction, paper, stay and glue.

R127-31 Folding Boxes: Lists 23 sizes (formerly 683).

R128-31 Corrugated Boxes: Lists 61 sizes (formerly 889). Selection of sizes in revised schedule based partly on observation of quantities actually used, and partly from estimate of range sufficient for all uses. Store practice indicated that 7 to 20 sizes would be adequate for normal requirements.

R129-31 Notion and Millinery Paper Bags: Lists 22 standard sizes of paper bags (formerly 343).

R172-38 Stock Folding Boxes for Garments and Dry Cleaning (September 1, 1938): Lists sizes of boxes and thicknesses of boxboard.

R173-38 Stock Folding Boxes for Millinery (November 1, 1938): Lists dimensions, thickness of boxboard, depth of covers,

Packages and packaging

R41-42 Package Sizes for Agricultural Insecticides and Fungicides (1926; 1938; 1940; 1942): Specified types and sizes of retail package, number of packages in shipping box and territory for which each package is adapted.

R60-30 Packaging of Carriage Machine and Lag Bolts (March 15, 1939): Lists standard packings, based on the quantity and gross weight, for each standard size and type of bolt.

R63-31 Packaging of Overhead Electric Railway (October 1, 1931).

R145-33 Packaging of Electric Railway Motor and Controller Parts (March 15, 1933).

R161-35 Packaging of Automotives (bus) Engine Parts (September 1, 1935).

R162-35 Packaging of Air Brake (Electric Railway) Parts (September 1, 1935).

The last four indicated above were developed by Purchases and Stores Committee on Standard Packages of the American Transit Engineering Assn. Adoption of them has resulted in savings and convenience in storing, unit piling, inventory, and distribution of parts.

R69 Packaging of Razor Blades (July 1, 1928): Lists the number of blades per package, the number of packages per carton for each make or brand of blade; revision needed to cover new brands.

R104-30 Packaging of Flash-Light Batteries (Effective July 1, 1930): Gives nominal dimensions of single standard zinc container, and unit of count or pack for small and large batteries.

R117-30 Packaging of Dental Plaster, Investment and Artificial Stone (October 1, 1930): Gives simplified schedule for packaging based on net weights for different classifications.



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Miscellaneous

- R44-36 Box Board Thicknesses** (1925; December 31, 1936): Lists standard thicknesses for different types of fibre box board. Also standard weights for 500 sheets and for 1,000 sq. ft. of different types.
- R47-28 Cut Tacks and Small Cut Nails** (July 1, 1928).
- R59 Rotary-Cut Lumber Stock for Wire-Bound Boxes** (November 1, 1926): Gives standard dimensions for air- and kiln-dried stock produced from gum and from pine or other soft woods.
- R68-41 Metal and Non-Conducting Flashlight Cases** (December 31, 1927; revised in July 1933 and again in June 1941): Covers kind of case for each style of flashlight.
- R92-38 Hard-Fiber Twine and Lath Yarn** (November 1, 1928; revised in 1932 and again in April 1938): Covers standard put-ups, nomenclature, etc.
- R93-39 Paper Shipping Tags** (September 1929); revised March 1, 1939): Lists standard sizes, stocks, etc.
- R110-29 Soft Fiber (Jute) Twine** (November 1, 1929): Includes standard put-ups, average breaking strength, etc.
- R114-30 No. 1 Kraft Paper Sealing Tape** (February 1, 1930): Cover grades, weights, packaging and marking, etc.

R124-31 Polished Cotton Twine (November 1, 1931): Lists weights of put-ups, standard packaging, colors, sizes of reels, etc.

R136-32 Flax and Hemp Twines (June 15, 1932): Shows a simplified schedule of stock varieties; standard put-ups, etc.

R144-42 Paints, Varnishes, and Related Products (September 1924; revised in 1931, 1937, 1939 and 1942): Covers recommended standard colors, shades and containers. See Schedule E, under War Production Board Limitation Order L-103, covering simplification of glass containers and closures for protective coatings.

R177-41 Single-Faced Corrugated Board Rolls (January 1, 1941): Covers recommended standard types used by retail dry goods stores.

R188-42 Clothespins—Spring and Slotted (April 1, 1942): Lists standard types and sizes also packaging.

R189-42 Toothpicks—Round and Flat Hardwood (April 1, 1942): Shows standard lengths and standard packaging.

R192-42 Crayons, Chalks and Modeling Clays for School Use (May 15, 1942): Lists standard types and sizes also standard packaging.

Wartime Package Simplification

by G. T. Kellogg

AS THE nation began arming itself the WPB was able to draw on the recommendations of the Division of Simplified Practices as a reservoir of already compiled information on conservation through simplification. This is true not only of packaging simplification recommendations, of course, but in dozens of other fields—valves and fittings, axes, hammers, forged tools, pipe and many others. Not only have the SPRs (Simplified Practice Recommendations) been used by WPB as bases for issuance of limitation orders on sizes and shapes of packages and other articles, but their terminology has been useful also to OPA and other agencies in defining certain categories of products.

Thus the contributions of the Division of Simplified Practice have aided the war effort first in helping to justify and then in the actual formulation of many of the so-called "M-orders," and "L-orders." The "M-orders" are intended to impose nation-wide control of the distribution and use of specific critical materials, and on the distribution and use of specific critical materials, and "L-orders" are prohibitions on the production of various types of end-products that are regarded as non-essential to the war program. Because mandatory simplification is a primary function of many of these orders, they are known as "Simplification Orders."

Frequently it is found necessary by the Division to make an emergency revision in an existing Simplified Practice Recommendation before it is incorporated into a WPB order; or a brand new recommendation is developed by the Division, on request of WPB, for immediate implementation of an order. Some in the last-named category are purely for the duration of the war, while others

are designed to become the foundation for post-emergency industry practice.

But perhaps the best way to show how the activities of the Division of Simplified Practice mesh with those of the war agencies is to cite a few of the numerous examples demonstrating how SPRs have been utilized in the drafting of special wartime orders.

WPB Order L-103, which centers on the simplified schedule for glass containers is a case in point. This order and its subsequent amendments, make use of data provided by the following SPRs:

- R10—Milk and cream bottles and bottle caps.
- R91-32—Glass containers for preserves, jellies and apple butter.
- R123-30—Carbonated beverage bottles.
- R131-35—Glass containers for mayonnaise and kindred products.
- R148-33—Glass containers for cottage cheese and sour cream.
- R156-41—Extracted honey packages.
- R196-42—Glass containers for green olives.
- R197-42—Glass containers for Maraschino cherries.
- R41-42—Agricultural insecticide and fungicide package.
- R144-42—Paints, varnishes and related products, as covered in Schedule E to Limitation Order L-103 as amended.

WPB Conservation Order M-104, as amended, is based on glass container and closure recommendations, and makes use of practically all of the same SPRs.

WPB Conservation Order M-81, as amended, covering simplification in use of cans, uses the study and conclusions involved in preparation of:

R155-40—Cans for fruits and vegetables.

R156-41—Extracted honey packages.

R41-42—Agricultural insecticide and fungicide packages.

R144-42—Paints, varnishes and related products (colors and containers).

Commenting on the above order, E. W. Ely, chief of the Division of Simplified Practice explains:

"Simplified Practice Recommendation R155-40, Cans for fruits and vegetables, which effected a reduction in variety from 200 to 39, or 80 per cent, is identified in Conservation Order M-81. This order was designed to conserve the supply and direct the distribution of tinplate and terneplate. Preference Rating Order P-115, Fruit and Vegetable Canning Plants, which is also related to the Simplified Practice Recommendations, contains the following paragraph:

"Among the largest savings to result from the elimination of tin cans for certain products are: beer cans, which last year used 1,600 tons; pork and beans, 1,440 tons; oil, 275 tons; coffee, 900 tons; tobacco, 200 tons; kidney beans, 200 tons; hominy, 150 tons; dog food, 820 tons."

WPB has issued Conservation Order M-221 (as amended), which covers simplification of textile and paper shipping bags, and which will affect R41-42, agricultural insecticide and fungicide packages, R70-42, salt packages and others.

Limitation Order L-239, covering folding and set-up boxes, specified the gage list promulgated in SPR R44-36 for boxboard thicknesses. Also, the specifications for sizes and types of set-up boxes and folding boxes adopted as standards by the store members of the National Retail Dry Goods Assn., and promulgated in R126-41, Set-up paper boxes, and R127-41, Folding paper boxes, are being revised to bring the standards in line with L-239 during the emergency.

L-239 also makes use of the following SPRs:

R120-40—Ice cream cartons.

R172-38—Stock folding boxes for garments and dry cleaning.

R192-42—Crayons, chalks and modeling clays for school use (types, sizes and packaging).

These are some of the outstanding examples, and other WPB limitation and conservation orders are in the process of being developed and promulgated as this is written. For one thing, there are at this time a number of schedules for glass containers, covering a long list of products hitherto not subject to simplification orders, being considered for issuance under the glass container order, L-103.

Also, it is understood that orders are on their way for grocer's bags, notion and millinery bags, paper cups and other types of paper containers—and these, too, will be based on the data already developed by the Division of Simplified Practice.

Born during an earlier war, it can truly be said that the Division of Simplified Practice is in this one with both feet, calling up all the knowledge it has gained in the past 25 years for the nation's and industry's welfare.

Standards and Individualism

by Dr. John Gaillard

A FEW years ago, a packaging machinery manufacturer scheduled to give a talk at a meeting, stepped up to the platform with a boxfull of bottle caps. By way of introduction, he held some of the caps up to his audience and explained that he had brought them as an exhibit of horrors. Designed by artists commissioned to create individual and attractive glass containers and closures, the caps had spherical, conical, parabolical, ogival and other shapes. But all of them had one feature in common: They did not give a bottle-capping machine a fair chance to grip them. On the contrary, they appeared to be intended to slip from any holding device. Yet a simple change in shape, such as a set of tiny flats on the sides, would have made the cap fit for machine-handling. And these flats, while meant for a purely functional purpose, might have formed an attractive little ornament as well.

Engineers and artists

The speaker's convincing and amusing demonstration was symbolic of some special problems raised by the dual character of the packaging industry. Functionally, a package must be designed on the basis of technical considerations. To hold, protect and sometimes dispense the product for which a package is intended, it must meet requirements of size, strength, rigidity, tightness, resistance to atmospheric influences, and so on. Also, being itself a product meant for mass distribution, a package must be suitable for manufacture, and for being "assembled" with the merchandise it has to carry, by a machine process. In this respect, a package is no different from any other industrial product with a purely utilitarian purpose. The problems involved must be solved by engineering methods. The other major performance expected of most packages—at least those in-

tended for the ultimate consumer—is just the opposite of functional. The package must get the attention of the prospective customer, be so attractive as to increase his (or her) incentive to buy the product contained in it, and advertise the latter and its manufacturer. To meet these conditions, the appearance of the package must stand out—it must be “different,” if possible, from anything the public has seen as yet, but it must not make its appeal with undue loudness.

The assignment thus given the artist is in complete contrast with the technical man's job of constructing and handling the package. The artist feels that the more individualistic his design, the better the package will work as a “stop and look” signal for the passer-by and as a hallmark for the product. Therefore, he will be inclined to hold out for the greatest measure of freedom in design and to rebel against anything that may cramp his creative efforts. Of course, he will have to bear in mind the cost of producing the package. The advertising manager may ask him to change a design which the artist believes to be harmonious, to a more conspicuous one. Or, conversely, he may have to tune down a vivid design because the sales manager believes it would jolt the conservative taste of the customers in the market for which the package is intended. Then, there are technical limitations in the artist's own field—in printing, in color work, in the use of materials, and so on. Thus, the artist, while bent on being individualistic, is far from enjoying complete freedom of action. Having plenty of troubles of his own, he may easily disregard restrictions imposed on the package for “engineering” reasons. In fact, he may reason that it is only fair if the technical men solve this part of the job, the more so as the artist believes that in this mechanical age, a machine can be made to do almost everything.

Standardization a constructive function

The most important resistance to the full benefit out of standardization is caused by human nature. As soon as standardization is conceived as a positive, constructive, creative force in human work—and hence, in industrial management—instead of as a negative, restrictive, leveling-down influence with which we have to put up against our will, astonishing results are achieved in streamlining the operations of individual manufacturing concerns and, in fact, of entire branches of industry. This statement is not based on mere theory, but on the experience gained during some twenty-five years by the national standardizing bodies.

By its very nature, standardization is an integrating function. Coordination and, hence, the need of standards, begins with the cooperation between two or more individuals. Teamwork adds up into departmental activity and the performance of different departments of a company, into the operation of the concern as a whole. The individual firm, again, is the elementary unit of a branch of industry; the next stage is, therefore, standardization as a function of the trade—often recognized as a distinct activity and systematized under the auspices of a trade association. In the packaging field, we have the



Standards for colors, through the scientific establishment of a basis for comparison, are obtained through the spectrophotometer; involved is the use of light rays. Photo American Standards Assn.

examples of the Packaging Machinery Assn. and the Glass Container Assn. Different trades often have common interests so that unified standards would benefit all of them. Thus, the builders of packaging machinery and the machine tool builders have an equal interest in standards for screw threads, in the mechanical field, and for the performance ratings of motors, in the electrical field. In such cases, a national standard acceptable to all parties is the best solution with a view to economy in production, ready availability of the components or units concerned, and the use of tools and machinery required in applying the standard—such as the taps and dies for threading machine parts to the specifications of the American Standard for Screw Threads.

National and international uniformity

This need for unification of standards becomes most pressing in an emergency. If a shell fuse made by one company is to be readily assembled to a shell made by another firm, the threads on the two parts must be identical to a very high degree of accuracy. In the beginning of the first World War, conditions in industry were chaotic in this respect. To remedy this, five engineering societies founded a national body to function as the coordinating agency for industrial standardization work, now known as the American Standards Association—or, briefly, the ASA. Its membership has grown to include some eighty national organizations. In addition to technical societies, such as The American Society of Mechanical Engineers, the American Institute of Electrical Engineers and the American Society for Testing Materials, its membership comprises such trade associations as the National Machine Tool Builders Association, the National Electrical Manufacturers Association and the American Iron and Steel Institute, as well as a number of federal agencies, such as the Departments of War, Navy and Commerce. Similar national standardizing bodies have been created since the first World War in all industrial countries.

PACKAGING LAW

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The Food, Drug and Cosmetic Act

MOST important, most drastic, and broadest of all laws affecting packaging is the Federal Food, Drug and Cosmetic Act of 1938. In some way or other, this Act affects from 70 to 80 per cent of all packages placed upon the market.

The present Act is the most recent of a series of federal enactments which began with the passage, in 1890, of a law prohibiting the importation into the United States of adulterated or unwholesome foods, drugs or liquors.

In 1906, after prolonged discussion, a Food and Drug Act, known as the Wiley Act, was passed and remained in effect until superseded by the present Act. In May of 1933, the first draft of the present Act was submitted to Congress and after several revisions and the taking of thousands of pages of testimony, the present Federal Food, Drug and Cosmetic Act was passed and signed by the President on June 25, 1938. A later bill postponed the effective date of certain mandatory labeling provisions to January 1, 1940, and the effective date of other provisions to July 1, 1940. Since these postponement dates have now been passed, the Act is fully in effect.

The Food and Drug Administration, formerly in the Department of Agriculture, was transferred to the Federal Security Agency in 1940. The personnel of the Administration was not changed, however, and continuity of administrative procedure has been maintained.

The Food, Drug and Cosmetic Act is a very complex document made further complicated by the multiplicity of rulings and regulations issued under it. It is impossible, therefore, in a general description of the Act, to cover every point that may arise in the repackaging of any given product. The following sections, however, discuss the more general applications of the Act as they affect packaging.

Packagers are advised to consult with the local offices of the Food and Drug Administration or with their attorneys before entering into the production of any package, package part or label which might come under the regulation imposed by the Act.

Packaging provisions

Packaging provisions of the Act differ slightly in their application to foods, drugs and cosmetics. All three categories of products are covered by a provision against packaging under insanitary conditions which may lead to contamination with filth or may render the product injurious to health. All three categories likewise are covered by a provision against the use of containers composed, in whole or in part, of any poisonous or deleterious substance which may render the contents injurious to health. Failure to conform to either of these provisions constitutes adulteration.

Containers for all three categories of products must

References: See also page 239, Labels, Seals, Tags and Marking Pieces; also page 161, Bottles and Jars.

not be so made, formed or filled as to be misleading. Products in such containers are subject to the Act's penalties for misbranding. As an indication of the types of containers falling under this provision, the Chief of the Eastern District of the Food and Drug Administration provided the following list of factors contributing to deceptive packages:

- 1) Glass Bottles
 - a) Thick glass
 - b) Panels
 - c) Excessive height
 - d) Indented bottoms
 - e) Irregular shapes
 - f) Magnifying shapes
- 2) Opal Jars
Same as 1; also raised covers
- 3) Cardboard, Fibre and Metal Containers
 - a) Excessive size (slack-filled)
 - b) False bottom
 - c) Indented bottom
 - d) Raised covers
- 4) All Types of Containers
Oversize cartons
- 5) Facing
- 6) Deceptive Colored Wrapping
- 7) Excessive Wrappings
- 8) False Packing

In any particular instance, it is a question of fact, whether or not a container is deceptive, and no iron-clad rules can be laid down. A number of rules or formulas have been proposed to assure compliance with the provisions of the Act covering misleading containers. Best known of these is the so-called Bristol formula for the manufacture of cartons in reduced sizes that more nearly fit tubes of tooth paste.

Manufacturers who pack odd-shaped bottles in cartons have been confronted with the possibility of falling under the deceptive packaging provision because the carton fill often falls as low as 25 per cent. Where the bottle itself is not deceptive, some manufacturers have recently endeavored to correct possible deception in the packages by printing a facsimile of the bottle label on outside of the carton. In the absence of Court interpretation, the Administration has not objected to this, provided it is done in such a way as to show the exact size of the bottle.

Another formula, developed by the State of North Dakota in the enforcement of the State Food and Drug Act, is used for determining whether bottles are deceptive. The formula is intended to contrast the true capacity with the apparent capacity, since bottles made of thick glass or with panels sunk in the sides or bottoms or bottles of odd shapes or with long necks appear to have a greater capacity than they actually possess.

North Dakota declared as normal, glass containers appearing $1\frac{1}{2}$ times their capacity. That is, if the external volume of the bottles plus the volume of any panels or outside indentation is not more than $1\frac{1}{2}$ times the capacity of the bottle, then the containers are considered to be normal. This rule has been applied to 2- and 4-oz. glass bottles.

The Food and Drug Administration has done considerable investigation on bottles of larger size which would indicate that the ratio of apparent size to actual capacity becomes progressively less as the size increases.

The heights of bottles set forth below are over-all heights and represent the distance from the extreme top of the bottle (no stopper) to the bottom by outside measurement. The Food and Drug Administration has tentatively accepted these heights as satisfactory for the various sizes and the figures may be regarded as the respective maximum permissible heights:

Capacity Ounces	Height Inches
$\frac{1}{2}$	$3\frac{13}{32}$
$\frac{3}{4}$	$3\frac{21}{32}$
1	$4\frac{1}{32}$
$1\frac{1}{2}$	$4\frac{15}{32}$
2	$4\frac{29}{32}$
3	$5\frac{5}{16}$
4	$5\frac{29}{32}$

Of course, bottles meeting these requirements as to height may be deceptive due to other causes as, for example, irregular shape, undue thickness of glass, indented bottoms and panels.

Many types of deception cannot be covered by formula (or have not to date been covered by formula). The shape of an article may throw the package into the deceptive class as, for instance, in the case of chocolate bars which have been excessively thinned out to provide an extremely large ratio of package face to its weight. Deceptive colored wrapping applies particularly to the use of transparent colored materials as, for instance, the use of an orange transparent film to wrap partially smoked fish. This is interpreted as having the effect of giving the fish a rich color and, hence, the appearance (the deceptive appearance) of being fully smoked.

Manufacturers have had much difficulty with products that settle after packing, such as spices, talcum powder, tooth powder, and the like. A method of measuring the package content of spices, and a minimum content requirement based on the capacity of the container, have been worked out by the American Spice Trade Association. The same requirements are applicable to talcum powder, tooth powder, tea, and free-flowing macaroni products, and may later be found to apply to other materials. This is an informal guiding figure which, if met or exceeded, would in the opinion of the Administration constitute a satisfactorily filled package for the products indicated. To meet the requirement the maximum and

minimum volumes occupied by two ounces (avoirdupois) are determined by the following so-called

Spice method

Maximum Volume: Roll two ounces of spice back and forth on a sheet of paper 10 times, fill into a 250-cc. graduated cylinder and note the volume.

Minimum Volume: Vigorously tap the cylinder 100 times and read volume; tap 20 times and again read volume; continue till 20 taps reduce the volume less than 1 cc. and note the final volume. To obtain the proper minimum volume where cosmetic powders are concerned, it is necessary to pound the cylinder vigorously rather than to tap it.

The average volume for any given weight of spice is obtained by direct proportion, using the average of the maximum and minimum volumes of two ounces obtained as indicated above. The per cent of fill is calculated from the average volume occupied by the spice and from the capacity of the container; for example, if the average volume occupied by the spice is 90 cc. and the container has a capacity of 100 cc., then the per cent of fill is 90 per cent.

Provisions affecting labeling

The terms "label" and "labeling" are not used synonymously in the Act. The term "label" is defined as a display of written, printed or graphic matter upon the immediate container of any article and a requirement that any word, statement or other information appear on the label shall not be considered to be complied with unless it also appears on the outside container or wrapper of the retail package of such article or is easily legible through the outside container or wrapper. The term "labeling" means all labels and other written, printed or graphic matter upon any article or any of its containers or wrappers or accompanying such article.

The food labeling provisions of the Act fall into 12 rules—two in the form of prohibitions and ten in the form of affirmative requirements:

1. The labeling of a food must not be false or misleading in any particular.
2. A food must not be offered for sale under the name of another food.
3. The label of a food which is an imitation of another food must bear, in type of uniform size and prominence, the word "imitation" and, immediately thereafter, the name of the food imitated.
4. A food in package form must bear a label containing the name and place of business of the manufacturer, packer or distributor.
5. A food in package form must bear a label containing an accurate statement of the quantity of the contents in terms of weight, measure or numerical count. Reasonable variations shall be permitted and exemptions as to small packages shall be established by regulations.
6. If a food purports to be or is represented as a food for which a definition and a standard of identity have been prescribed by regulations, its label must bear the name of the food specified in the definition and standard and, insofar as may be required by such regulations, the common names of optional ingredients (other than spices, flavoring and coloring) present in such food.

7. If a food purports to be or is represented as a food for which a standard of quality has been prescribed by regulations and its quality falls below such standard, its label must bear, in such manner and form as the regulations specify, a statement that it falls below standard.

8. If a food purports to be or is represented as a food for which a standard or standards of fill of container have been prescribed by regulations and it falls below the standard of fill of container applicable thereto, its label must bear, in such manner and form as the regulations specify, a statement that it falls below standard.

9. A food which does not purport to be one for which a definition and a standard of identity have been prescribed by regulations must bear on its label the common or usual name of the food, if any there be and, in case it is fabricated from two or more ingredients, the common or usual name of each such ingredient. Spices, flavorings and colorings, other than those sold as such, may be designated without naming each. Exemptions may be established by regulations to the extent that naming of the ingredients is impracticable.

10. If a food purports to be or is represented for special dietary uses, its label must bear such information concerning its vitamin, mineral and other dietary properties as the administrator determines, and by regulations prescribes as, necessary in order fully to inform purchasers as to its value for such uses.

11. If a food bears or contains any artificial flavoring, artificial coloring or chemical preservative, it must bear labeling stating that fact. To the extent that compliance with this requirement is impracticable, exemptions shall be established by regulations. The requirement with respect to artificial coloring does not apply in the case of butter, cheese or ice cream.

12. Any word, statement or other information required by the Act to appear on the label or labeling must be prominently placed thereon with such conspicuousness (as compared with other words, statements, designs or devices in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

Drug labeling provisions

The provisions relating to labeling of drugs and devices fall within 14 rules, four constituting prohibitions and ten constituting affirmative requirements:

1. The labeling of a drug or device must not be false or misleading in any particular.

2. A drug must not be an imitation of another drug.

3. A drug must not be offered for sale under the name of another drug.

4. A drug or device must not be dangerous to health when used in the dosage or with the frequency or duration prescribed, recommended or suggested in the labeling thereof.

5. A drug or device in package form must bear a label containing the name and place of business of the manufacturer, packer or distributor.

6. A drug or device in package form must bear a label containing an accurate statement of the quantity of the contents in terms of weight, measure or numerical count. Reasonable variations shall be permitted and exemptions as to small packages shall be established by regulations.

7. A drug which is for use by man and contains any quantity of the narcotic or hypnotic substances named must bear on its label the name, and quantity or proportion of such substance or derivative and in juxtaposition therewith the statement, "Warning—May be habit forming." The named substances are alpha-eucaine, barbituric acid, beta-eucaine, bromal, cannabis, carbromal, chloral, coca, cocaine, codeine, heroin, marihuana, morphine, opium, paraldehyde, peyote, sulphomethane and any chemical derivative of any such substance which derivative has been designated by regulations as habit forming.

8. The label of a drug which is not designated solely by a name recognized in an official compendium must bear the common or usual name of the drug, if such there be, and in case it is fabricated from two or more ingredients, the common or usual name of each active ingredient, including the quantity, kind and proportion of any alcohol and also including whether active or not, the name and quantity or proportion of any bromides, ether, chloroform, acetanilid, acetphenetidin, amidopyrine, antipyrine, atropine, hyoscyne, hyoscyamine, arsenic, digitalis, digitalis glucoside, mercury, ouabain, strophanthin, strychnine, thyroid or any derivative or preparation of any such substances contained therein. To the extent that compliance with requirements is impracticable, exemptions shall be established by regulations.

9. The labeling of a drug or device must bear adequate directions for use, provided that where the requirement as applied to any drug or device is not necessary for the protection of public health, the administrator shall promulgate regulations exempting such drug or device from such requirement.

10. The labeling of a drug or device must bear such adequate warnings against use in those pathological conditions or by children where its use may be dangerous to health or against unsafe dosage or methods or duration of administration or application, in such manner and form, as are necessary for the protection of users.

11. If a drug purports to be a drug the name of which is recognized in an official compendium, it must be packaged and labeled as prescribed therein, provided that the method of packing may be modified with consent of the administrator. Whenever a drug is recognized in both the U. S. Pharmacopoeia and the Homoeopathic Pharmacopoeia of the United States, it is subject to the requirements of the U. S. Pharmacopoeia with respect to labeling unless it is labeled and offered for sale as a homoeopathic drug, in which case it is subject to the provisions of the Homoeopathic Pharmacopoeia of the United States and not to those of the U. S. Pharmacopoeia.

12. The label of a drug which has been found by the Secretary to be liable to deterioration must bear a state-

ment of such precautions as regulations require as necessary for the protection of the public health.

13. A drug which purports to be or is represented as a drug the name of which is recognized in an official compendium, if its strength differs from, or its quality or purity falls below, the standard set forth in such compendium, must plainly state on its label its difference in strength, quality or purity from such standard.

14. Any word, statement or other information required to appear on the label or labeling must be prominently placed thereon with such conspicuousness (as compared with other words, statements, designs or devices in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

Cosmetic labeling provisions

Cosmetic labeling provisions fall within five rules, including one prohibition and four affirmative requirements:

1. The labeling of a cosmetic must not be false or misleading in any particular.

2. A coal-tar hair dye which may be injurious to consumers under the conditions of use prescribed in the labeling or under such conditions of use as are customary or usual must bear the following legend conspicuously displayed:

Caution: This product contains ingredients which may cause skin irritation on certain individuals and a preliminary test according to accompanying directions should first be made. This product must not be used for dyeing the eyelashes or eyebrows; to do so may cause blindness.

The labeling of such hair dye must bear adequate directions for such preliminary testing.

3. A cosmetic in package form must bear a label containing the name and place of business of the manufacturer, packer or distributor.

4. A cosmetic in package form must bear a label containing an accurate statement of the quantity of the contents in terms of weight, measure or numerical count. Reasonable variations shall be permitted and exemptions as to small packages shall be established by regulations.

5. Any word, statement or other information required to appear on the label or labeling must be prominently placed thereon with such conspicuousness (as compared with other words, statements, designs or devices in the labeling) and in such terms as to render it likely to be read and understood by the ordinary individual under customary conditions of purchase and use.

An exemption is provided for cosmetics which are to be processed, labeled or repacked in substantial quantities at establishments other than those where ordinarily processed or packed from certain labeling requirements of the Act, provided that such cosmetics are not adulterated or misbranded upon removal from such processing, labeling or repacking establishments. A similar exemption applies to drugs and foods. Small open containers of fresh fruits and fresh vegetables are also exempted by regulations from certain labeling requirements.

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OFFICIALS ADMINISTERING THE FEDERAL FOOD, DRUG AND COSMETIC ACT

ADMINISTRATOR OF THE FEDERAL SECURITY AGENCY
Paul V. McNutt

Food and Drug Administration

Commissioner of Food and Drugs: W. G. Campbell
Associate Commissioner: Dr. P. B. Dunbar
Assistant Commissioner: C. W. Crawford
Assistant to the Commissioner: F. B. Linton
Chief Inspector: G. P. Larrick
Interstate Division: L. D. Elliott
Division of State Cooperation: W. A. Queen
Drug Division: R. F. Herwick
Food Division: W. B. White
Microanalytical Division: H. Welch
Division of Pharmacology: H. O. Calvery
Vitamin Division: E. M. Nelson
Bacteriology Division: A. C. Hunter
Cosmetic Division: Dan Dahle

FIELD SERVICE

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Baltimore, Md.: 800, U. S. Appraiser's Stores, Gay and Lombard
Streets; M. McKinnon, Jr.
Boston, Mass.: 804, U. S. Appraiser's Stores, 408 Atlantic Avenue;
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Buffalo, N. Y.: 415, Federal Bldg., S. Division and Ellicott Streets;
(vacant)
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Charleston, W. Va.: 342, State Capitol Bldg.; W. R. Moses, resi-
dent inspector
Jacksonville, Fla.: 334, U. S. Court House Bldg.; G. R. Fowler,
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Philadelphia, Pa.: 1204, New Custom House, 2nd and Chestnut
Streets; C. S. Brinton
Pittsburgh, Pa. (substation): 303, Old Post Office Bldg.; D. F.
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Third Avenues, South; C. W. Harrison
New Orleans, La.: 225, U. S. Custom House, 423 Canal Street;
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Los Angeles, Calif.: U. S. Appraiser's Bldg., 1236 Palmetto Street;
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San Francisco, Calif.: 512, Federal Office Bldg., Fulton and Leaven-
worth Streets; H. C. Moore, Chief of Station
Seattle, Wash.: 501, Federal Office Bldg.; R. S. Roe
Spokane, Wash.: 415, Federal Bldg.; G. Downard, resident
inspector

Labeling provisions for coal-tar colors

The labeling requirements for certified coal-tar colors are found partly in the Food, Drug and Cosmetic Act itself and partly in the regulations for coal-tar colors. The label should carry:

1. An accurate statement of the net contents of the package, except certain small packages specifically exempted under regulation (M) under secs. 4036 (c), 502 (b) and 602 (b) of the Act.
2. The name and place of business of the manufacturer, packer or distributor.
3. In the case of mixtures for use in food, the names of the component colors and of each diluent contained in the mixture, or if they bear (a) "Certified Coal-Tar Color" or "Certified Coal-Tar Colors"; and (b) the common name of each diluent therein.
4. The name of the color.
5. The lot number of the batch.
6. The pure dye content of the color.
7. In the case of a color certified for a limited use, a statement setting forth this limitation.

Certain small packages of certified coal-tar colors are exempt from the labeling requirements which are relative to net contents.

Adulteration

Numerous provisions in the law apply to the adulteration of foods, drugs and cosmetics. In most cases these provisions do not affect the packaging operations or the packages themselves, except insofar as the penalty for adulteration involves a confiscation and seizure of packaged products. However, the provisions of the law applying to preparation or holding of foods, drugs or cosmetics under insanitary conditions obviously apply to packaging as well as to processing conditions.

Enforcement

The Food and Drug Administration is armed with a number of powers to secure the enforcement of provisions and prohibitions contained in the Act. Violation of the

prohibited acts, such as the introduction into interstate commerce of adulterated or misbranded foods, drugs or cosmetics is made a misdemeanor under the law. The penalty for such violation is imprisonment for not more than one year or a fine of not more than \$1,000 or both. Second offenders are liable to imprisonment for not more than three years or a fine of not more than \$10,000. Where intent to defraud or mislead is found, a penalty of three years imprisonment or \$10,000 fine or both may be imposed. These criminal provisions, while constituting a big stick behind the door, are perhaps the least utilized of the enforcement procedures provided by the Act. The Administration is empowered to proceed against merchandise as well as against persons. Articles that are adulterated or misbranded and introduced into interstate commerce are liable to seizure by the Administration and, if found by the courts to be adulterated or misbranded, may be disposed of by destruction or sale.

Such drastic proceedings are not, however, undertaken in most cases. The law provides that nothing in the Act shall be construed as requiring the Administration to report for prosecution or to institute libel or injunction proceedings where minor violations of the Act are concerned, provided the Administration believes that the public interest will be adequately served by a suitable written notice or warning.

Far more important to the average manufacturer than the criminal provisions or the seizure and trial provisions of the Act is the fact that failure to conform to the packaging and labeling provisions and consequent action by the Administration may involve the manufacturer in a whole series of extremely expensive package changes and may involve the loss of dealer good will, adverse publicity and a dislocation of production and shipments.

Because of these economic consequences—quite as much as because of the punitive provisions of the law—manufacturers in general make every effort to insure, in advance, that they achieve a satisfactory degree of compliance with every provision of the Act. To date, the Administration has proceeded only in the more flagrant cases of violation. This applies particularly to the newer provisions for which the groundwork had not been laid by the earlier Food and Drug Act.

State and Local Laws

STATE legislatures, through their inherent police power as well as through their constitutional powers involving the protection of public health and the like, have undoubted rights to pass legislation to protect the public against adulterated and misbranded foods, drugs and cosmetics. The validity of state laws is in no way affected by federal laws, except where the former are conflicting.

The nature of state statutes differs considerably in the various states. At least 39 states have laws relating specifically to packaging, labeling, adulterating, or misbranding. Several of these have adopted the Federal Food, Drug, and Cosmetic Act of 1938 in its entirety, among them: California, Connecticut, Delaware, Louisiana, New Jersey, North Carolina, Oklahoma, Oregon,

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OFFICIALS ADMINISTERING STATE REGULATORY LEGISLATION

- Alabama:—Director, Division of Agricultural Chemistry, Department of Agriculture and Industries, Montgomery.
- Arizona:—Director, State Laboratory, Tucson. State Dairy Commissioner, Phoenix. Secretary of State, Phoenix.
- Arkansas:—State Health Officer, Little Rock. Secretary, State Board of Pharmacy, Little Rock.
- California:—Chief, Bureau of Food & Drug Inspection, State Department of Public Health, San Francisco. Chief, Bureau of Dairy Service, Division of Animal Industry, Sacramento.
- Colorado:—Food & Drug Division, State Dept. of Health, Denver. State Dairy Commissioner, Denver. State Director of Agriculture, Denver.
- Connecticut:—State Dairy & Food Commissioner, Hartford. State Chemist, Connecticut Agricultural Experiment Station, New Haven.
- Delaware:—Executive Secretary, Board of Health, Dover. Chemist, State Board of Agriculture, Dover.
- District of Columbia:—Health Officer, Washington, D. C.
- Florida:—Commissioner of Agriculture, Tallahassee. State Chemist, Tallahassee.
- Georgia:—Commissioner of Agriculture, Atlanta. State Chemist, Atlanta. Chief Food Inspector, Atlanta. Chief Drug Inspector, Atlanta.
- Hawaii:—Food Commissioner and Chemist, Honolulu.
- Idaho:—Director of Public Health, Boise. State Chemist, Boise.
- Illinois:—Director of Agriculture, Springfield. Liquors: Department of Finance, Springfield. Milk: Department of Health, Springfield.
- Indiana:—Chief, Food & Drug Bureau, State Board of Health, Indianapolis. Chief, Bureau of Dairy Products, State Board of Health, Indianapolis.
- Iowa:—Secretary of Agriculture, Des Moines. Chief Chemist, Department of Agriculture, Des Moines.
- Kansas:—Secretary, State Board of Health, Topeka. Assistant Chief Food & Drug Inspector, State Board of Health, Topeka.
- Kentucky:—Director, Bureau of Foods, Drugs & Hotels, State Department of Health, Louisville.
- Louisiana:—President, State Board of Health, New Orleans. Chief, Food & Drug Section, State Board of Health, New Orleans.
- Maine:—Chief, Division of Inspection, Department of Agriculture, Augusta.
- Maryland:—State Food & Drug Commissioner, Baltimore. Deputy Commissioner, Department of Health, Baltimore.
- Massachusetts:—Director, Division of Food & Drugs, Department of Public Health, State House, Boston. Director, Division of Standards, State House, Boston.
- Michigan:—Director, Bureau of Foods & Standards, Department of Agriculture, Lansing. Director, Bureau of Dairying, Department of Agriculture, Lansing. State Analyst, Department of Agriculture, Lansing. Director of Drugs & Drug Stores, State Board of Pharmacy, Lansing. Director, Bureau of Fruit & Vegetable Inspection, Department of Agriculture, Lansing.
- Minnesota:—Commissioner, Department of Agriculture, Dairy & Food, St. Paul. Chief Bacteriologist, Department of Agriculture, St. Paul. Chief Chemist, Department of Agriculture, St. Paul.
- Mississippi:—Commissioner of Agriculture and Commerce, Jackson. State Chemist, State College.
- Missouri:—State Health Commissioner (Food & Drug Laws), Jefferson City. Commissioner of Agriculture (Dairy, Ice Cream, Egg Laws), Jefferson City.
- Montana:—Director of Foods & Drugs, Department of Public Health, Helena. Division of Dairying, Department of Agriculture, Labor & Industry, Helena.
- Nebraska:—Director, Department of Agriculture and Inspection, Lincoln. Chief, Bureau of Dairies (Foods and Weights and Measures), Lincoln.
- Nevada:—State Food & Drug Commissioner, Reno.
- New Hampshire:—Director, Division of Chemistry & Sanitation, State Board of Health, Concord. Commissioner, Weights & Measures, Concord.
- New Jersey:—Chief, Bureau of Foods & Drugs, Department of Health, Trenton. Chief, Bureau of Chemistry, Department of Health, Trenton.
- New Mexico:—Director of Public Health, Santa Fe. State Dairy Commissioner, State College.
- New York:—Commissioner, Department of Agriculture & Markets, Albany. Director, State Laboratory, Albany. Secretary, State Board of Pharmacy, State Education Building, Albany.
- North Carolina:—Commissioner of Agriculture, Raleigh. State Chemist, Department of Agriculture, Raleigh.
- North Dakota:—State Food Commissioner & Chemist, Bismarck. State Dairy Commissioner, Bismarck.
- Ohio:—Director, Department of Agriculture, Columbus. Chief, Division of Foods & Dairies, Department of Agriculture, Columbus.
- Oklahoma:—State Commissioner of Health, Oklahoma City.
- Oregon:—Director, Department of Agriculture, Salem. Chief, Division of Foods & Dairies and Weights & Measures. Chief Chemist, Department of Agriculture, Salem.
- Pennsylvania:—Director, Bureau of Foods & Chemistry, Department of Agriculture, Harrisburg. Secretary, State Board of Pharmacy, Harrisburg.
- Rhode Island:—Chief Inspector, Division of Foods and Drugs, State Department of Public Health, Providence.
- South Carolina:—Commissioner of Agriculture, Columbia.
- South Dakota:—Secretary, Dept. of Agriculture, Pierre. State Chemist, Vermillion.
- Tennessee:—Commissioner of Agriculture, Nashville. Superintendent, Division of Foods, Fertilizers, Dairies, Department of Agriculture, Nashville.
- Texas:—Director, Food & Drug Bureau, State Board of Health, Austin. Department of Agriculture, Austin.
- Utah:—State Board of Agriculture, Salt Lake City.
- Vermont:—Secretary, State Board of Health, Burlington. Chemist, State Board of Health, Burlington.
- Virginia:—Commissioner of Agriculture & Immigration, Richmond. Director, Dairy & Food Division, Department of Agriculture & Immigration, Richmond. Chief Chemist, Department of Agriculture & Immigration, Richmond. Secretary, State Board of Pharmacy, Richmond.
- Washington:—Supervisor, Food & Drug Division, State Department of Agriculture, Olympia. State Board of Pharmacy, Olympia.
- West Virginia:—Commissioner of Health (Foods and Drugs), Charleston. Commissioner of Agriculture (Foods), Charleston.
- Wisconsin:—Director, State Department of Agriculture, Madison. Chief, Dairy Division, Department of Agriculture, Madison. Supervisor, Food Inspection, Department of Agriculture.
- Wyoming:—Acting Commissioner, Department of Agriculture, Cheyenne. State Chemist, Laramie.

Tennessee, Utah, Vermont, and the Territory of Hawaii. Several other states have separate laws for foods and/or drugs and cosmetics, and some have special statutes covering dairy products: Arizona, Alabama, Arkansas, Colorado, Illinois, Indiana, Kentucky, Maryland, Massachusetts, Michigan, Missouri, Minnesota, Nebraska, New Mexico, New York, North Dakota, Rhode Island, and Virginia.

A few have special laws or regulations on packages, labels, weights and measures: Arizona, Delaware, Florida, Illinois, Iowa, Kansas (newly revised) Maine, Montana, Ohio, Pennsylvania, Washington, Virginia, West Virginia, and Wisconsin.

To aid federal laws

In general, state laws and local ordinances are designed principally to cover products manufactured within the state and sold only within the state (i.e., products

outside the reach of the federal authorities). Although they apply equally to foods, drugs or cosmetics *sold* within the state whether or not (in most instances) the product is manufactured within that state. Thus manufacturers are obliged, in planning new packages, to consider the effect upon package design, label and structure not only of the federal statute, but of the laws of the states in which the product is to be sold.

Check on state laws

Wherever the market in a given state promises a sizable present or potential sales outlet, the manufacturer will be well advised to check the state law and to attempt to make his package conform with state law requirements which may be more stringent or more restrictive than the federal law. State requirements cannot relax federal restrictions which prevail throughout the United States.

Regulations Affecting Special Trades

IN CERTAIN industries and when shipping through certain channels, packagers are required to conform to the rules and regulations of both the government agencies and the semi-official organizations representing such groups as the railroads or the motor freight carriers. The new and the more important of these regulations are discussed here. More detailed data should be obtained from the particular bureaus or organizations which have jurisdiction in the individual case.

Labeling of wool products

One of the most important new statutes is the Wool Products Labeling Act of 1939, which became effective July 15, 1941. Under its rules and regulations every wool product subject to the Act must be marked by a stamp, tag, label or other means of identification in conformity with its requirements.

The information on the identification must include the fibre content of the product, the maximum percentage of any non-fibrous loading, filling or adulterating matter, in the total weight of the product, and the name of the manufacturer, or of a person subject to Section 3 with respect to the product.

Such name need not appear upon the label if it bears an identification number registered and assigned by the Federal Trade Commission as the mark that identifies the manufacturer and by which the latter is bound as fully as though his name were used provided that in addition to this number, the label or mark of identification

bears the name of at least one person who subsequently sells the product to a retailer or consumer. The name of the re-seller, together with the manufacturer's registered number, should remain on the label until it is delivered to the consumer.

To use a registered number instead of his name upon the label or mark of identification on his product, a manufacturer may make application to the Federal Trade Commission. The Commission will assign to him such registered number or numbers as are appropriate for his use and suggest the form that the label or mark of identification should take.

Such application to the Commission must be made in writing, duly executed under oath or affirmation, and must be submitted in quadruplicate in a special approved form.

The application must be accompanied by a statement of the business conducted by the applicant and designation of the kinds of wool products manufactured or sold by him.

Types of labels and affixing of marks

The stamp, tag, label or other identification, must be appropriate to the nature of the product and must be affixed securely enough to remain on the product in good condition throughout the sale, distribution and handling of the product until it is delivered to purchaser. The required information may be stenciled, imprinted or branded upon the product itself, or attached to it in the form of a strong, durable tag securely tied to it.

The label or other mark of required information must be affixed to and displayed on the container, wrapper, binder or other means of packaging of wool products subject to the Act

- (a) where marking the product itself is impossible, or where such marking would be inadequate to give consumers the required information or to prevent deception;
- (b) where the wool products are marketed or sold and delivered in a container that remains intact until after it is delivered to the consumer. If possible the packaged product must also be marked appropriately to show the required content of fibre and material, especially if it is likely to be removed from the sealed container or the container is to be opened for purposes of display, sales or other reasons, before it is purchased. Where the product bears a label or mark of identification which is clearly visible to the purchaser when offered for sale, no label or mark of identification need be placed on such container.

Liquor package regulations and labels

The Alcohol Tax Unit of the Bureau of Internal Revenue of the Treasury Department of the United States is charged with the administration of laws and regulations concerning distilled spirits, wines, fermented malt beverages, cereal beverages, industrial alcohol and related products. Under these, the Bureau regulates the size, marking, use and re-use of containers designed or intended for use for the sale and resale of distilled spirits. The regulations governing the production, blending and bottling of alcoholic beverages are many and varied. The following pamphlets are available from the Superintendent of Documents, Washington, D. C., detailing the regulations applicable to the labeling of wines, malt beverages and distilled spirits:

- No. 4.* Labeling and Advertising of Wine.
- No. 5.* Labeling and Advertising of Distilled Spirits.
- No. 6. Bottling of Distilled Spirits in Bond.
- No. 7. Relative to the Production, Fortification, Tax Payment, etc., of Wine.
- No. 7.* Labeling and Advertising of Malt Beverages.
- No. 11. Bottling of Tax Paid Distilled Spirits.
- No. 13. Traffic in Containers of Distilled Spirits.
- No. 15. Rectification of Spirits and Wines.

In the case of wines, the following label information is required:

On the brand label:

1. Brand name.
2. Class and type.
3. Name and address of bottler or importer, preceded by the phrase "Bottled by" or "Imported by" as the case may be, except that such information may appear on a separate strip label, front or back, if

* These regulations were issued pursuant to the provisions of the Federal Alcohol Administration Act.

the name and address of the person for whom the product is bottled, preceded by the phrase "Bottled for," or "Distributed by," etc., appears on the brand label.

4. The alcoholic content by volume is required under the provisions of the Federal Alcohol Administration Act only on labels of wine containing more than 14% of alcohol by volume. However, Internal Revenue Regulations 7, 11 and 15, described above, require statements of alcoholic content, by volume, on labels of all wines bottled on bonded winery, bonded storeroom, taxpaid warehouse, or rectifying premises.
5. The net contents, unless such statement is blown or branded in the container.

In the case of distilled spirits, the mandatory information requirements are as follows:

On the brand label:

1. Brand Name.
2. Class and type.
3. The names and address of the distiller, rectifier, bottler or importer, preceded by the phrase "Distilled by," "Blended by," "Made by," "Prepared by," "Manufactured by," or "Imported by," whichever may be applicable. If, however, the name and address of the retailer or distributor, preceded by the phrase "Bottled for," or "Distributed by," appears on the brand label, the foregoing mandatory "Name and Address" information may appear on a separate label, front or back.
4. The age of brandy, if less than two years old, must be stated.

On the government label:

Unless all of the mandatory information (including the following) appears on the brand label, a separate back label known as the Government label, bearing the following information, must be used:

- (a) Class and type.
- (b) Alcoholic content by proof, except in the case of cordials and liqueurs and specialties, when the alcoholic content may be stated in percentage by volume.
- (c) Net contents, unless blown in the bottle.
- (d) Age or storage statement (in the case of whiskey, or one of the varieties of straight whiskies) and percentages (in the case of blended whiskies or blends of straight whiskies).
- (e) Percentage of neutral spirits (when required) and name of commodity from which distilled.
- (f) Artificial or excessive coloring (if used).
- (g) The State of Distillation (in the case of whiskey or any of the varieties of straight whiskey).

It should be noted that although only labels affixed to bottles of distilled spirits introduced in interstate or foreign commerce are subject to the labeling provisions of Regulation No. 5, similar labeling requirements are con-

tained in Regulation No. 13, which are applicable to all distilled spirits packaged for sale at retail, irrespective of whether or not such spirits are intended for introduction into interstate or foreign commerce.

In the case of malt beverages, the following label information is required to appear on the brand label:

1. Brand name.
2. Class and type.
3. Name and address of the brewer or bottler. In addition, the name and address of a distributor or retailer, preceded by the phrase "Distributed by" or "Bottled for" may appear on the brand or back label.
4. Alcoholic content statements may not appear unless specifically required by state law.
5. Net contents.

Generally speaking, all of the labeling regulations under the Federal Alcohol Administration Act provide the following requirements:

- (a) Contrasting background
- (b) Size of type.
- (c) English language.
- (d) Location of label.
- (e) Labels firmly affixed.
- (f) Additional information on labels.
- (g) Representations as to materials.

The regulations also provide for the submission to the Bureau of full and accurate statements of composition when required.

The regulations also list certain prohibited practices such as the simulation of Government stamps, the use of misleading statements and statements relating to curative or therapeutic effects.

The Federal Alcohol Administration Act provides also for the issuance of certificates of exemption from label approval, if the bottler, producer, blender or wholesaler of wine is able to show to the satisfaction of the Bureau, that the alcoholic beverages to be bottled will not be sold, or offered for sale, or shipped, or delivered for shipment or otherwise introduced in interstate or foreign commerce. The Statute provides, further, that alcoholic beverages may not be bottled or introduced into commerce unless the bottler has in his possession either a certificate of label approval or certificate of exemption from label approval covering the labels used in such bottling operations. Applications for certificates of label approval (Form 1647) or exemptions from label approval (Form 1648) may be obtained from the office of District Supervision, Alcohol Tax Unit, within the district in which the bottler is located.

Detailed information as to the requirements of the various regulations governing the labeling of distilled spirits, wine and malt beverages, may be obtained from the Alcohol Tax Unit, Bureau of Internal Revenue, Treasury Department, Washington, D. C.

Regulations 5 and 13 prescribe standard sizes for liquor

bottles. They are: one gallon, one-half gallon, one quart, four-fifths quart, one pint and one-half pint. In addition, four-fifths pint containers are permissible for bottling Scotch and Irish whiskies, and Scotch and Irish type whiskies, as well as brandy and rum. Regulation 5 also provides for standard size containers of specified sizes of less than one-half pint.

The regulations also provide for the application of tax stamps over the mouth of each bottle of distilled spirits, or compounds containing distilled spirits and on certain types of wines. Stamps may not be concealed or obscured. The Internal Revenue Regulations also provide for the manner of affixing stamps on bottles, as well as stamps and markings on cases and barrels.

Federal trade commission

Under the Wheeler-Lea Act, an amendment of the Federal Trade Commission Act passed in March of 1938, the Commission was given more effective powers of control over false advertising of foods, drugs, devices, and cosmetics. Detailed information on the regulations under this Statute may be obtained from any office of the Commission.

Additional federal food statutes

There are a number of statutes, relating to foods, viruses, serums, toxins, insecticides, etc., which have been on the books for many years. In most cases, the name of the act describes the special group of products falling under its provisions. Those that fall under the jurisdiction of the Food and Drug Administration are: the *Filled Milk Act*, the *Import Milk Act*, the *Tea Importation Act*, and the *Federal Caustic Poison Act*, together with the following which relate specifically to the Federal Food, Drug, and Cosmetic Act: the Act of March 4, 1923, defining butter and providing a standard therefor; the Act of July 24, 1919, defining wrapped meats as in package form; and the *Seafood Act* of August 27, 1935.

The Insecticide Act is still administered by the Department of Agriculture.

Postal department regulations

The Post Office Department has prescribed regulation as to the preparation, wrapping and packing of parcel-post or fourth-class mail matter. These regulations are contained in Circular 3 of the Division of Classification, available through any postmaster and in circular issued by the Second Assistant Postmaster General, entitled "Preparation, Wrapping and Packing of Mail Matter."

Examination: Fourth-class matter must be so wrapped that the contents may be examined easily by postal officials. When not so wrapped, or when it contains writing not authorized by law, the matter is subject to first-class postage.

Nailed boxes: Parcel-post mail may be enclosed in the boxes to which the lids can be readily removed with a chisel or screw driver for examination of contents.

Containers and packing: All matter must be se-

curely packed and wrapped or packed in a strong container so as to bear transmission without breaking or injuring the mail bags, their contents or the persons handling them. Many articles are damaged in the mails because they are not properly packed to withstand the necessary handling.

Containers previously used for shipping high explosives having a liquid ingredient (such as dynamite) must not be used for shipments of any article by parcel post. Containers which have been used for the shipment of other high explosives must have all marks removed before being used for shipment of articles by parcel post.

Harmful articles not absolutely excluded from the mails, but which, from their form or nature, might, unless properly secured, destroy, deface or otherwise damage the contents of the mail bag or harm the person of anyone engaged in the postal service, may be transmitted in the mails only when packed in accordance with the postal regulations.

Pyroxylin plastics (celluloid, fiberloid, pyralin, viscoloid, zylonite, etc.), in sheets, rods or tubes, must be packed in strong spark-proof wooden boxes and to each parcel must be attached the diamond-shaped yellow caution label described in section 588, Postal Laws and Regulations.

As an exception to the above, pyroxylin sheets in packages not exceeding one-half inch in thickness may be packed in containers made of two thicknesses of strong double-faced corrugated fibreboard and small quantities may be shipped in strong strawboard tubes lined with single-faced corrugated pasteboard.

Admissible liquids and oils in packages not exceeding the limit of weight of fourth-class matter will be accepted for mailing when intended for delivery at the office of mailing, or on a rural route starting therefrom, when enclosed in securely closed containers, provided it is not necessary to transport them over steam or electric railways.

Admissible liquids and oils, pastes, salves or other articles easily liquefiable shall be accepted for mailing, regardless of distance, when they conform to the condi-

tions prescribed by section 590, Postal Laws and Regulations, which may be consulted at any post office.

Mailable liquids in tightly closed metal containers in quantities of 1 gallon or more shall be accepted for mailing when suitably boxed or crated to be dispatched outside of mail bags and labeled "Fragile—liquid. This side up," but when in extra strong metal containers, such as heavy milk cans, the boxing or crating may be omitted.

Fragile articles: Articles easily broken must be securely packed in wooden or strong double-faced corrugated fibreboard boxes with ample cushioning material of excelsior, crushed paper or the like, completely surrounding each article to prevent damage. All such parcels must be labeled "Fragile."

Perishable articles must be marked "Perishable" and it is advisable that they be sent as special delivery matter by affixing stamps for the special delivery fee in addition to the regular postage, thus expediting their delivery. Articles likely to spoil within the time reasonably required for transportation and delivery will not be accepted by post office authorities for mailing.

Unmailable matter: All matter is unmailable which is of a harmful nature, such as poisons, explosives and corrosive articles, etc.

Requests for further information should be addressed as follows:

Third Assistant Postmaster General, Division of Classification: for rules on the classification and admissibility of matter as parcel-post mail, rates of postage, limit of weight and size, manner of addressing and wrapping so as to permit examination, permissible enclosures and additions, attaching communications to parcels, etc., and for additional copies of Circular 3.

Third Assistant Postmaster General, Division of Registered Mails: for rules on the insurance, C.O.D. (including demurrage charge) and registry features.

Second Assistant Postmaster General, Division of Railway Mail Service: for rules on the admissibility to the mails and wrapping and packing of matter which from its form or character would be liable to injure the mails or the person of postal employees.

Package and Trade-Mark Trespassing

by L. W. Mida

A MANUFACTURER introducing a new package would be less likely to trespass upon another manufacturer's design or trade-mark if he had a better knowledge of what constitutes "unfair competition." Usually it is the lack of that knowledge, rather than malicious intent,

that creates the fault. Knowing what is condoned or condemned by the Courts should, therefore, assist honest intentions.

It is natural to assume that a reasonable amount of difference in the design of packages and trade-marks

should be sufficient to avoid trouble, but what is considered "reasonable" by some might prove the contrary in the light of decisions. To avoid the dangerous crossing of the border is largely a matter of common sense. The purpose here is to assist good judgment by some examples of citations in Court decisions. Some of these citations may not be perfect guides, but at least they point the way for broad guidance.

Package trespassing

The title "package" comprehends any container or covering, including wrappers and labels. Invasion of any of these is governed by the same simple underlying principles. The ruling question is whether the average buying public—known to be extremely lax in recalling the exact appearances of anything—is likely to be confused in normal purchasing. Having this one point well in mind and following it literally will save much litigation. A mistake is often made in trying to compromise on minor changes in color schemes and other details which, when examined closely, might seem sufficient. The average person, however, usually does not examine objects closely, and often does not have the two packages side by side for comparison.

The origination of packages in the modern trend has created a fine art of distinctiveness and attractiveness, which offers wide latitude in the avoidance of similarities. Today, there is no valid excuse to cut corners in resemblances. Trade papers have greatly helped manufacturers to overcome the problems of infringement by publishing new patterns in design. This substantial service points directly to the marketing advantages of a package that is outstanding in its entirety. Such a package, in itself, assures immunity from involvement in infringements.

Color differences

While there can be no monopoly of colors as such, the abuse, not the use, of these eye-catching combinations is the seat of much trouble. There is a popular notion that the transposing of color features removes reason for complaint, overlooking the fact that where a dominating color gives exclusiveness to design, there is a property right in such exclusiveness. For instance, the fact that one package has a distinctive gold and black dress does not mean that others cannot use gold and black, except in so far as it affects the good-will of prior users. Virtually every suit on the grounds of "colorable imitation" finds the defendant inviting a Court opinion through lack of regard for this basic index.

Copyright legality

The benefits of copyright are well recognized. However, manufacturers commonly make the mistake of neglecting to apply for copyright at the legal time. That time is properly upon the first production of the package, wrapper or label, not just anytime in later years whenever the spirit moves. To wait until the goods have been on the market for a considerable period before obtaining

the copyright certificate might prove a boomerang. If evidence proves non-compliance with the letter of the copyright law, the copyright might be held illegal and vacated in a Court test. Such lack of foresight can defeat an otherwise entirely meritorious case of alleged imitation.

Unfair competition

Under this sweeping head may be gathered a multitude of complaints, the most conspicuous and numerous being those that embody trade-marks as expressed by brand names. What constitutes trespassing in brand name only can best be illustrated by actual findings. When dealing with the three tests customarily applied—i.e., similarity of sound, appearance and meaning—these opinions usually are soundly rendered. When other distinguishing features are added, such as similarities in the actual package, together with representations made in selling, either in the accompanying literature or by word-of-mouth, the cases become more complex. The more involved the issue, the greater the margin for doubt, unless the complaint is clearly justified to the most casual observer. Where there is a strong element of doubt, the Court wisely takes into account the measure of popularity created by the original claimant, and views the infringement in the light of probable damage to that established popularity. This is held to constitute unfair competition in the invested property.

Trade-marks held confusingly similar

"PEPTO SELTZER" and "PEPSIMIC SELTZER AMELOTTE": The Pepsodent Co. vs. Pepsimic Seltzer Co. (26, C.C.P.A.-1210, 103F [2d] 362). While "Pepsimic Seltzer Amelotte" is descriptive and is registered under the 1920 Act, the use of descriptive marks may form the basis of an opposition. This is distinguished from the "Alka Seltzer" vs. "Pepso Seltzer" case in that, here, the marks as a whole are confusingly similar.

"MEADOW GOLD" and "OLD MEADOW": Abell vs. Beatrice Creamery Co. (23, C.C.P.A., 735; 79F [2d] 751). The marks, except in the arrangement of the words and the absence of the letter "G" in appellant's mark, are identical; goods the same.

"DOBRY'S SUNSWEET" and "SUNSWEET": California Prune and Apricot Growers Assn. vs. Dobry Flour Mills, Inc. (26, C.C.P.A.-910; 101F [2d] 838). "Sunsweet" in appellee's mark printed in larger type than the word "Dobry's," the words being associated with a representation of the sun, all inclosed within an elaborate border. The Court said: "We have no hesitation in holding that the marks are confusingly similar, and that the appellant has been damaged by the registration of appellee's mark. To hold otherwise would make it possible for one to appropriate a trade-mark which, through extensive advertising, had become a household word, by adding thereto the name of an individual."

"SUNNY MIST" and "SUNKIST": Florida Citrus Growers Cooperative vs. California Fruit Growers Exchange (25, C.C.P.A.-963; 95F [2d] 512). Goods of same descriptive properties but specifically different, one being *canned* citrus fruit and juices for food purposes, and the other fresh citrus fruits and by-products. This decision turned on the similarity of sound of the two marks. Further, there was some similarity in appearance in the use of a large "S" in both marks.

"E-Z" and "KLAD-EZEE": E. Z. Mills, Inc., vs. Martin Brothers Co. (25, C.C.P.A.; 992-95F [2d] 269). While the marks, tested by appearance alone, are not confusingly similar, a very different impression is made when the sound is compared. That similarity in sound alone is sufficient to constitute confusing similarity between marks is well established.

"SOLVEX" and "NO-VEX": Albert I. Falls, doing business as Falls Chemical Company vs. The Scholl Mfg. Co., Inc., (24, C.C.P.A., 1308-90F [2d] 499). While it appeared that the word "Scholls" was printed on the opposer's labels as a prefix to the word "Solvex," the latter word was the dominant feature of such labels, and some purchasers would call for "Scholl's Solvex" others would ask simply for "Solvex."

Trade-marks not confusingly similar

"ALKA-SELTZER" and "PEPSO-SELTZER": Miles Laboratories, Inc., vs. The Pepsodent Co. (26, C.C.P.A.-1272; 104F [2d] 205). The arbitrary terms "Alka" and "Pepso" are the dominant portions of the respective trade-marks. "Seltzer," in each mark, is descriptive and, therefore, public juris, and cannot indicate origin.

"SPIRALATOR" and "ROLLATOR": Borg-Warner Corp. vs. Easy Washing Machine Corp. (26, C.C.P.A., 1256; 104F [2d] 1256). Goods specifically different (refrigerators and washing machines), but Court found it not necessary to determine whether or not they were goods of same descriptive properties, in view of wide difference in marks. "VAPEX" and "VICKS," or "VAPORUB": Vick Chemical Co. vs. Thomas Kerfoot and Co., Ltd. (23, C.C.P.A.-752; 80F [2d] 73). "Vicks" and "Vapex" have only the initial letter in common and while they terminate with the same sound, they are clearly distinguishable in that one has only one syllable while the other has two. The Court quoted with approval the remarks of the Commissioner of Patents as to the difference between "Vaporub" and "Vapex," as follows: "As between 'Vaporub' and 'Vapex' the only similarity, either when written or spoken, is the first syllable, 'Vap-'; and in view of the obvious differences it is difficult to comprehend how this one syllable in common would confuse."

Cumulative differences in marks and goods

"NEET" and "NEXT": Affiliated Products, Inc., vs. Crazy Water Co. (26, C.C.P.A.-1331; 104F [2d] 366). "Neet" used on depilatories and antiperspirants; "Next" used on shaving cream and shaving, toilet and bath soaps. Differences in marks and goods held cumulative in preventing confusion in trade, but goods held to be of the same descriptive properties. The Court said: "We have no doubt but that the involved marks, even though they may be made up of the same number of letters, and begin and end with the same letters, appear to the ocular sense in a quite different way."

"BUDGET SPECIAL" and "TETLEY'S BUDGET TEA" (Special and Tea disclaimed): Tetley and Co., Inc., vs. Bay State Fishing Co. (23, C.C.P.A.-969; 82F [2d] 299). The first is used on fish, variously put up; the other on tea. Court ruled that the goods are of the same descriptive properties but specifically different. "Taking into consideration the differences in the marks and the dissimilarity of the goods on which the respective marks are used," the Court held that concurrent use in trade of the two marks would not be likely to cause confusion.

"AEROLATOR" and "KELVINATOR": Kelvinator Corporation vs. Norge Corp. (Borg-Warner Corp. substituted) (25, C.C.P.A.-857; 94F [2d] 384). First used on air conditioning apparatus; second on refrigerators. Goods held to be of same descriptive properties, but specifically different. The suffix "-ator" is common to both marks and in the trade generally. It is not the dominating feature of either mark and the prefixes "Aerol" and "Kelvin" are quite dissimilar. The goods are comparatively expensive, "are purchased with a considerable degree of care and discrimination on the part of the purchaser . . . They are not a matter of every-day purchase upon the part of an individual like food products or other products that require frequent replacement."

"DICAL-D" and "DIAL": Ciba Pharmaceutical Products, Inc., vs. Abbott Laboratories; Society of Chemical Industry in Basle, vs. Same. (50 U. S. P. Q. 139; C.C.P.A. 7-2-41.) Goods probably of same descriptive properties but entirely different in character and uses. "Dial" is used as a dormative, sedative, or hypnotic while "Dical-D" is a preparation used to meet Vitamin D, calcium and phosphorous deficiencies. One "Dial" is sold over the counter in any drug store to any

purchaser, while the other is sold only on a doctor's prescription. "The fact that both are medicinal in character and have a therapeutic effect on users, of necessity makes carefulness in selection imperative."

Infringement with unfair competition

"PEPTOMINT" and "PEP-O-MINT": L. P. Larson, Jr., Co., et al., vs. Lamont, Corliss and Co.; Same vs. Mint Products Co. (265-O.G.148, 257 Fed. Rep. 270). Appellant, Larson, registered in 1912 a trade-mark showing on an arbitrary design, the disclaimed words "Peptomint Gum," and re-registered the mark in 1915 with a disclaimer of the word "Mint" apart from "Pepto." In 1914 he notified the appellee, Lamont, that its use of a certain flavor-indicating mark, "Pep-O-Mint," infringed his mark "Peptomint." The evidence indicated that "Peptomint" was generally considered a corrupt spelling of "peppermint" and was so pronounced; that appellee did not imitate appellant's labels in any way nor make any attempt to palm his goods off as those of the appellant, was not guilty of unfair competition. In the Mint Products Co. case, appellant was himself guilty of unfair competition in changing his labels so as to imitate the display on appellee's labels, which through long and extensive advertising had acquired a secondary significance as indicating the origin of appellee's goods.

"CHIPSO" and "CHASE-O" (confusingly similar): The Procter and Gamble Co. vs. J. L. Prescott Co. (22, C.C.P.A.-1173; 77F [2d] 98). Appellant's (Procter and Gamble's) registration ordered canceled. Appellee established prior use and the Court held that there was a likelihood of confusion in trade at the time appellant's mark was registered and that such mark should therefore not have been registered at that time. It was not necessary that the appellee, petitioner, establish actual confusion in trade. Furthermore, it was not material in this proceeding that the appellee, after the registration of appellant's trademark, changed both the design of its carton and the composition of its product to make them more nearly like those of the appellant. All questions of appellant's right to use its mark and of unfair competition were disregarded, the only question properly before the Court being that of appellant's right to register. Said the Court: "The question of simulating the size and color of packages is a subject matter which belongs to domain of unfair competition. We are not concerned with it here."

Unfair trading

There is no unfair competition merely because plaintiff's and defendant's containers are similarly colored where they do not look much alike and defendant places its name on its containers. Taylor Instrument Co. vs. Fee and Stenwedel, Inc. (District Court of N. D. of Ill., 5-6-41).

Where an arbitrary word used as a trade-mark for certain fruits had acquired a secondary significance as indicating origin in the plaintiff, defendant's use of the same word in connection with fruit juices constituted unfair competition. California Fruit Growers Exchange, et al., vs. Windsor Beverages, Ltd., et al. (48, U.S.P.Q.608; 2-28-41—CCA-7th Circuit Court).

Where defendant adopted a label with the same blue border and red script of the wording, the only difference being in the brand names and those having the same significance, the differences were submerged in the more prominent features of the label which were copies, and defendant was guilty of unfair competition. Kraft-Phenix Cheese Corp. vs. R. E. Robertson, Inc. (25, T.M.Rep., 119; U.S.D.C., East. Dist. of Ill., 12-14-34).

Where defendant had so simulated in coloring and marking the caps, cartons and labels of the plaintiff as to mislead the purchasing public, he was guilty of unfair competition, even though he did not infringe plaintiff's trade-mark. Simulation amounting to unfair competition does not reside in identity of single features of dress or markings nor in indistinguishability when the articles are set side by side, but is tested by the general impression made by the offending article upon the eye of the ordinary purchaser or user. If the general impression which it makes when seen alone is such as to lead the ordinary purchaser to believe it to be the original article, there is an unlawful simulation. Chesebrough Mfg. Co., Consolidated vs. Old Gold Chemical Company, Inc. (25, T.M.Rep. 149; U.S.C.C.A., 6th Circuit Court, 4-13-34).

The facts that defendant adopted a tin-foil wrapper for its cheese and that its labels are in triangular shape does not convict it of unfair competition where the plaintiff had previously adopted a similar wrapping and similarly-shaped labels, such wrapping and shape of labels being public property. *Wm. Fachndrich, Inc., vs. Wheeler Riddle Cheese Co., Inc.* (19, T.M.Rep., 356; U.S.D.C., East. Dist. of N. Y., 1929). Defendant's use of the trade-mark "Gold Mark" for hosiery on labels having similar colors and stripes as those upon which plaintiff displayed its trade-mark "Gold Stripe," was obviously unfair competition as well as trade-mark infringement. Court held it was no test of infringement that the ordinary purchaser could discern dissimilarities between plaintiff's labels and symbols and those of the defendant, when they are placed side by side. The test was whether the similarity was

such that it would mislead the ordinary observer or purchaser. *Gotham Silk Hosiery Co. vs. Reingold* (210 N.Y. Sup 38; 15 T.M.Rep. 368.)

Where no fraudulent intent was shown, it was not unfair competition for defendant to put out toilet preparations in combination gift boxes, generally much like those of the plaintiff in size, shape and color of cartons or boxes, no one feature of the box being exactly like that of plaintiff. Both were limited, by public taste, in their selection to containers of delicate coloring, the inscriptions being different but inconspicuous. The general rule is that neither use of same colors nor of same form of containers, cartons or labels constitutes unfair competition, when such features are in common use in the trade, especially when they serve purposes of utility, convenience or attraction. (U.S.D.C.-27T.M. Rep. 554—approved by C.C.A. 3rd Circuit Court, 39 U.S.P.Q. 86.)

Package and Trade-Mark Protection

THROUGH the use of patents, trade-marks or copyrights, a manufacturer introducing a new package may avail himself of a degree of protection.

Package constructions are patentable under the same terms as are all other new and useful inventions. Such patents are issued by the United States Patent Office for terms of 17 years with renewal provisions. It is advisable, whenever the question of patenting a packaging development is to be considered, to consult an experienced patent attorney.

If the design of the package or container is new and ornamental, a design patent may also be secured. Design patents are for terms of three-and-one-half, seven or fourteen years, depending upon the term applied for and the fee paid to the Patent Office.

Trade-marks

A trade mark protects the name or symbol under which an article of merchandise is sold. The United States Patent Office provides facilities for registration of trade marks—that is, names or symbols or a combination of both—used by manufacturer to identify a particular product. This protection applies only to articles used in interstate or foreign commerce. The mark must be one which is still available for use as determined by having a search conducted through the registered and published marks in the Trade Mark Division of the United States Patent Office.

There are many cases of trade-marks in use by manufacturers who have secured neither Federal nor State registration of the mark. In this event, the manufacturer who seeks to register his mark can ascertain only whether or not such an unregistered mark is in use by his own observations in the particular field or by consulting with experts in that field.

In this connection, it should also be borne in mind that even if the Patent Office considered the mark registrable and passes it to publication, any persons, firms, etc., who may deem themselves injured by the granting of the registration, may file an opposition, whereupon

evidence may be presented and a decision rendered by the proper tribunals of the Patent Office.

Even after a registration has been passed to issue by the Patent Office, and the registration has been issued, a petition for cancellation may be filed by any persons, firms, etc., who may deem themselves injured by the registration, and procedure similar to that in filing oppositions is then to be followed.

Many manufacturers and laymen believe that once they secure a Federal Trade Mark Registration, their rights are fully protected and nothing further need be done. However, the government, of its own initiative, will take no steps to halt an infringer of a patent or trade mark. It is incumbent upon the owner of the infringing patent or trade mark to bring suit in Federal Court.

Copyright registration

Labels, cartons designs, displays, etc., may be copyrighted provided they are artistic creations used in the sale of goods. Such copyrights are for a period of 28 years and may be renewed for 28 years, and must be originally published with notice of copyright. A label or print is considered published when it has been printed ready for use.

A label must be something attached to the goods, as by pasting onto the container. Cartons, cans, wrappers, etc., are classed in this category and may be registered in their entirety when submitted in flat form. A print cannot be attached to the goods, but must be used to advertise them; advertisements in magazines, street car cards, displays, etc., make up this group. Copyright gives the owner the right to sue directly in federal courts to obtain damages fixed by law.

There are instances, also, in which prints, pictorial illustrations, pamphlets, etc., may be copyrighted in the Copyright Division of the Library of Congress. But this type of copyright, though more economical, must not be confused with the Patent Office copyright.

To secure copyright register, the user first applies a copyright notice to the object to be covered by copyright. Application is then made to the Patent Office.

CARTONS *and* BOXES

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The Paper Industry Meets War Demands

by J. D. Malcolmson

THE continued existence of any American industry during 1943 depends almost wholly upon its essentiality to the war effort. Judged by this yardstick, there is no question that the paper and paperboard industries will continue to operate at about 80 per cent of their pre-war volumes. It has been said that if all pulp, paper and converted paper items were suddenly to become non-existent, the war would either end abruptly within a few months or revert to more primitive methods. This is self-evident when it is considered that wood pulp furnishes one of the largest sources of materials for military explosives, and, in fact, in Europe practically all such explosives are now being produced from wood pulp. Moreover, the absence of paper would obstruct the vast mass of correspondence, instructions, blueprints, maps and other necessary records.

The pulp and paper industry including its converted products consists of over 3,000 establishments employing over one-quarter million wage-earners whose annual products are valued at over two billion dollars. The size of such an industry naturally presents major problems as regards maintenance of essential production on one hand and the curtailment of non-essential on the other. In addition to being a very large user of all types of transportation and a notable employer of labor, this industry consumes large amounts of electric power and basic raw materials.

Growth of paper

Expansion in the American pulp industry has been very great during the past few years. In the ten-year period from 1925 to 1934, domestic output furnished only about 70 per cent of the total pulp supply, the balance coming from imports. In the last seven years, however, the total yearly output of American pulp mills has doubled so that by 1942 this output was providing 90 per cent of the total supply. This trend is particularly interesting when the large increase in consumption is taken into account. Much of this expansion in domestic production is due to the development of new techniques in making sulphate pulp from the resinous southern pine tree which up until about 15 years ago had been considered unsuited to pulping operations.

In addition to wood, paper and board are also made of such materials as rags, straw and rope fibres, although paperboard itself, when made in the North on cylinder machines, uses wastepaper as the principal raw material. Both the cylinder and the Fourdrinier machines constitute some of the largest stationary machines used by any industry and often cost as much as one million dollars

each. They vary in width from 10 to 30 feet wide overall and some are 350 feet long.

The Fourdrinier paper machine operates by straining the water out of a solution containing about 99 per cent water and one per cent fibre. Most of this water is strained out through a finely woven copper screen acting as a rapidly moving endless belt often over 200 inches wide and as much as 60 feet long. This leaves a sheet of interlaced fibres which is then picked up by an endless felt belt and carried between large pressure rolls where more of the water is removed. The sheet is then carried over steam-heated cylinders where the balance of the water is removed and finally through a calender stack which contributes density and surface finish.

The cylinder machine

The cylinder machine is used primarily for making heavy paperboard, although, strangely enough, some models also turn out tissue paper. This latter is accomplished simply by using fewer cylinder vats. The standard paperboard machine has six or seven cylinder vats, each of which is equipped with a cylinder or "mold" covered with a copper screen. As the mold rotates in the vat, the fibres remain on the surface of the screen while most of the water flows through the mesh. An endless overhead blanket in contact with each cylinder picks up these fibres, thus building up what may be considered a six or seven-ply formation. Actually the fibres become so intermeshed that these plies are not distinguishable. This sheet is then passed through similar pressure, drier and calender rolls as in the case with the Fourdrinier machine.

Certain types of paper such as newsprint, uncoated book paper and common wrapping paper are used in the form in which they leave the machine. Other types are converted into a great many different products such as clay-coated papers, solid fibreboard, paper bags, envelopes, cartons, drinking cups, facial tissue and thousands of other items. An excellent idea of the large number of converted products available can be secured by consulting Lockwood's Directory of the Pulp and Paper Industry and the Dictionary of Paper inasmuch as these volumes list almost every conceivable end product. Many of these are already familiar to readers of the PACKAGING CATALOG but new ones are springing up every day especially under the impetus of wartime demands. For example, we have already seen paper used in containers for finished artillery rounds, gas mask forms, expendable raincoats, paper pull-overs for protection against poison gas, coat hangers, lipstick tubes, concrete forms, life-boat ration packages, Army helmet liners, filing cabinets, insulating jackets for hot water tanks and wire winding spools, to say nothing of the long list of containers being

(Editor's Note: In this article use was made of "The Pulp and Paper Industry in War and Peace" by W. L. Neubrech and A. C. Schumacher, in the December 1942 issue of Survey of Current Business, and "Paperboard Industry Meets War Demands" by George R. Coxe in the November 26, 1942, issue of Domestic Commerce.)

developed to substitute for critical materials. This list is being added to almost daily.

As with nearly every other industry Government controls have been instituted affecting pulp and paper operations. Early in the war when chlorine for bleaching became critical, General Order M-11 reduced the "whiteness" of paper. This was followed by General Order M-93 in March 1942 which placed rigid restrictions on the industry by providing for a system of pulp allocations. Standardization and simplification practices were initiated on July 4, 1942, by Order L-120 and additional simplification has been going on not only in the paper industry, but in other industries which use paper products. Moreover, the civilian consumption of canned goods has been drastically restricted and this in turn reflects back to the fibre container which is used almost entirely for the packing of this product. Limitation Order L-239, issued January 8, 1943, provides that food, wearing apparel and many other familiar products sold at retail must be packaged in new and standardized types of paperboard boxes, while some merchandise is forbidden to be packaged at all. This includes bottles of liquor, inflated basket balls, toilet paper in rolls. On the same day WPB Order M-241a forbids the use of paper on a great many other items such as aprons, ash trays, coin cards, shirt boards, party decorations, confetti and punch boards, and in other instances this order limits production to certain percentages such as envelopes 90 per cent, facial tissue 90 per cent, toilet paper 110 per cent.

WPB restrictions

WPB Order 2322, announced Jan. 8, 1943, goes even

further by mentioning production percentages for entire industries. Thus, book paper is cut to 80 per cent, wrapping paper to 85 per cent, while container board is left at 100 per cent.

As mentioned above, there is ample pulp wood in the forests but the Government limitations were necessary not so much on account of raw materials as on account of rubber and labor shortages. The present supplies of pulp wood have already receded so far from the pulp mill locations that much of it has to be trucked in and this in turn calls for rubber tires. Labor shortages affect this industry just as seriously as all other industries. Thus the Pacific Northwest, an important source of wood pulp, is already experiencing serious difficulty in obtaining woods labor due to the competitive attraction of the shipbuilding and other new war industries in that region with their higher rates of pay. Labor, therefore, promises to be the primary reason direct or indirect for any further action in curtailment and concentration of production and in limitation of uses of paper products.

Paper, essentially, is a complementary product to our civilization, following the general demand for other products: The things we wear, the food we eat and other things we use are indirectly dependent on paper in that they are wrapped in paper, the bookkeeping is done on paper and often they are paid for with paper. Paper is strictly functional—in a subsidiary sort of manner—there is little demand for paper in and of itself. Hence, as demands for civilian goods rises, the demand for paper increases; conversely, as demands drop, the need and uses for paper fall off.

Wood Pulp in the Paperboard Industry

by J. D. Malcolmson

WOOD is made up in about equal quantities of two principal ingredients, *cellulose* and *lignin*. The cellulose consists of tiny individual fibres which are tough and flexible and almost white in color. Cotton is cellulose in almost pure form. Lignin is a dark-colored cement which binds these fibres together and gives wood its hardness and structural strength. Lignin is of no value to the paper maker and must be cooked out and discarded in order to make available the valuable cellulose fibres. There are only a very few chemicals which will cook this lignin out economically without injuring the cellulose.

Wood pulp is classified according to the manufacturing method by which it is produced. The two principal classifications are: 1. Groundwood or Mechanical Pulp; 2. Chemical Pulp.

Groundwood pulp: Groundwood pulp is produced by grinding a peeled log against a revolving stone (natural or artificial). This constitutes the lowest quality of pulp manufactured because of the inferior

strength, short length, stiffness of the fibres and impurity of the pulp. These bad qualities are due to the retention of all of the lignin. It is generally used in conjunction with some other longer-fibred pulp and finds its greatest use in the manufacture of newsprint, tissues, paperboard, and cheap magazine and pad papers. Picnic pie plates are 100% groundwood. Newsprint is about 85% groundwood. The yellowing and loss of strength of newsprint with age is due to the lignin in the groundwood. Occasionally the wood is steamed before grinding, which causes a better separation of the fibres. The woods commonly used are spruce, hemlock, balsam, fir, aspen, poplar and willow.

Chemical pulps: Chemical pulps are produced by cooking the wood which has been reduced to chips about an inch square, in large metal digesters with chemicals under high heat and pressure. This serves to separate the cellulose (or pure fibres) from the lignin and other impurities. The impurities are dissolved in the cooking liquid and the degree of cooking determines the

purity and also the physical characteristics of the pulp. Any of the chemical pulps may be bleached, which consists of whitening the pulps by the use of a bleaching chemical.

There are three principal kinds of chemical pulp.

- (1) **Soda Pulp** is cooked with a solution of caustic soda (sodium hydroxide). It is a weak, soft, pure pulp used largely in book and magazine papers. It is seldom used in the manufacture of paperboard except for a small amount in the top liner of white patent-coated board. The woods commonly used are spruce, hemlock, aspen.
- (2) **Sulfite Pulp** is an acid pulp, produced by a liquor which is a mixture of the bi-sulfites of calcium and magnesium. This pulp, which combines very high purity with good strength, is used in high-grade writing papers, book papers, folding boxboard, tissues, and also as the base for artificial silk and plastics. The "white patent coated" surface of folding boxboard is mostly bleached sulfite. Woods used in making this are the same as for soda pulp.
- (3) **Sulfate Pulp** is an alkaline pulp produced by gentler cooking with a mixture of caustic soda (sodium hydroxide) and sodium sulfide. It is stronger but less pure pulp, containing enough lignin to add cementing matter. **Kraft Pulp** is an under-cooked sulfate pulp which is the strongest but the most impure sulfate pulp. Considerable success has been enjoyed recently in bleaching rather well-cooked sulfate pulp to make a very strong and very white sheet, with better bending qualities than sulfite stock.

Bleached sulfate is often used for the topping on corrugated liners or for sheet-lined board, but not for white patent coated board. The principal woods used are long-fibred conifers such as jack pine, southern pine, spruce, cypress, redwood, and larch.

Principal paperboard products of wood pulp*

Paperboard is made as much as possible of old papers. Old papers contain the same fibres as new pulp yet they are cheaper. New pulp is added in sufficient proportion to bring the strength, bending quality and color up to the required standard. Because of the many grades of waste papers and pulp, and the multi-cylinder construction of a board machine, it is possible to produce an almost infinite variety of boxboards. Among the most common are the following:

Chip: Made up almost entirely of mixed papers. Occasionally stronger fibres are added to produce *test chip*. The filler of most vat lined paperboards is chip.

News: Made of old newspapers. The gray color is due to disseminated printer's ink. News is usually used as the inner surface of other boards (e.g., "White patent coated news back"). Occasionally boards are made of *solid news*.

Manila: Name derived from manila rope fibres, but manila today contains no rope fibres. Boards and papers are still made of these fibres but the product is called "rope paper." Manila has come to mean a yellowish sheet containing 50% or more of groundwood.

* WPB Order L-239, dated Jan. 8, 1943, specifically limits paperboard production as to percentages of used and virgin pulp for certain purposes. See "Folding Box Directives."

Non-bending manila: About $\frac{2}{3}$ groundwood, $\frac{1}{3}$ unbleached sulfite, plus some yellow dye.

Bending manila: The same except that the proportions are about 50-50.

Bleached manila: The same as the two listed above except that the yellow dye is omitted and some blue and red are added to neutralize the yellow of the groundwood.

White patent coated: Usually has a top liner made of bleached sulfite pulp, unbleached sulfite pulp, and some soda pulp. Waste paper from envelope factories, etc. (known as *hard white shavings* and *soft white shavings*), are substituted for the more expensive sulfite pulps wherever possible. The filler is usually chip.

Manilas: Patent coated and other grades can be colored in the beater (beater color) or on the calender (calender stain). They are then called yellow patent coated news, orange calender stained manila, etc.

Mist board: Usually has top of news, or news and sulfite to which has been added some dyed kraft fibres.

Solid boards: Usually have a more expensive filler than chip. Examples are *Solid Sulfite* and *Solid Manila* (groundwood). Solid boards often have a top liner different from the filler such as *White Patent Coated Solid Manila*.

Container boards: More attention paid to strength than to color whereas *Folding Box Boards* (listed above) are more concerned with appearance and bending quality.

Test liners: Used on corrugated and solid fibre shipping containers must meet official Mullen test.

Jute liners: Test liners made from re-worked papers plus enough new pulp (usually kraft) to meet the required specifications on strength. Most of the new kraft pulp is concentrated on the outer skin or "top liner," and on the second layer or "under liner."

Kraft liners: Made of solid new kraft pulp, they are lighter in weight than jute but more expensive per ton.

Fourdrinier kraft liners: Made on a single wire screen and have no vat lined formation. They are lighter in weight than "Cylinder Kraft Liners." *Dry Finish* Fourdrinier Kraft Liners are lighter in weight than *Water Finish* Fourdrinier Kraft Liners.

Filled kraft liners: Intermediate between *Jute* and *Cylinder Kraft* in that they contain $\frac{3}{4}$ or more of new kraft pulp. The term is indefinite.

Corrugating sheets: Usually .009 thick and made of a variety of raw materials, the most popular of which are wheat straw and solid kraft. *Mill Straw* consists of high-grade stock chemically treated to increase rigidity.

None of the above sheets contains adhesive, their only lamination being the plies of the vat lined sheets made on a cylinder machine. They can be combined with adhesives to other sheets to form an almost endless variety of combined products such as solid fibre-board, corrugated board, pasted chip, sheet-lined boards, caddy board, wallboard, etc.

Paper Assumes New Packaging Duties

IN THE FOOD FIELD by C. A. Southwick
 IN THE DRUG FIELD by Stanley Burnham
 IN THE COSMETIC FIELD by Edythe Bright
 IN WAR PACKAGING by John Strange

NEARLY every material available for packaging at the start of the war has been enlisted for the duration. Paper is taking up the slack and is bearing a tremendous load, substituting for metal containers, plastics and rubber. To what extent this is being done in the fields of foods, drugs and cosmetics going directly to the retail consumer, is indicated in the three discussions which follow. The role which paper is playing in heavy packaging for civilian and war use, is discussed elsewhere in *PACKAGING CATALOG* under the sections on shipping containers and fibre drums.

IN THE FOOD FIELD

Foods for human consumption require special care in packaging, either because the foods themselves must be carefully protected against contamination or because surrounding space and products must be protected. Many materials, now on the critical list, were found particularly adaptable for this purpose, so that the demands on the non-critical field—paper in particular—have been quite severe. Two types of paper products have borne the brunt of the burden: those normally, in themselves, capable of giving protection—such as glassines, parchments and the like—and those capable of accepting special treatment so they may do functional jobs. Thin, well-finished kraft, and sulphites with moisture-proof, greaseproof and heat-sealing coatings were among the latter.

As the military demands on cellulose films grow, the burden on paper will become even greater, especially if varieties of foods and sizes of packages are to be continued. Fortunately the paper industry has been able to meet many of the demands because it has had experience in the manufacture of paper suitable for many functional uses. Performance, rather than appearance, is the es-

sential quality today and so transparency and other decorative factors have been reduced in importance. Today, waxed and laminated papers are finding increasing uses by the frozen food industry, for packaging dehydrated soups and as overwrappings or liners for many products.

Paper closures are needed

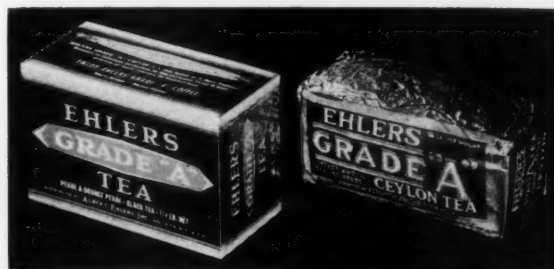
Metal restrictions have been so drastic that many food products, previously packaged in glass with metal closures and in fibre-bodied cans with metal tops and bottoms, must now find new types of containers or be withdrawn from the market. As a result there has been a great deal of "hurry up" work done to find ways and means of forming, turning or using highly functional papers into acceptable jar caps. One factor which has retarded a large-scale commercial use of fibre caps has been the lack of production equipment. This is complicated by the fact that it does not appear possible to convert existing metal cap manufacturing equipment to paper.

However, paper caps are appearing on the market in increasing numbers for products which require vacuumizing as well as for those which carry limited amounts of free liquid and for products requiring moisture protection. The most difficult problem today is the vacuumized glass jar with a paper cap for roasted ground coffee.

The problem of obtaining fibre ends to take the place of metal ends of a fibre-bodied can is also extremely difficult. In this case, the ends-stock must be formed in such a way that it can be combined to the body and further anchored by means of aqueous adhesives or thermoplastics. So far there has been a limited production of cleansing powders in an all-fibre can. However, it has not been possible to make a structure of this kind incorporating papers having a high level on moisture-proofness. This work is going on and should result shortly in the production of fibre cans having improved



Foods, customarily packed in metal today go to market in paper. Left: Coffee bags and cartons replace tin. Right: Foil once used in packing tea, is now in war use.





Upper: This greaseproof bag-in-carton for shortening was the forerunner of many wartime packages. Lower: Cone-shaped package of waxed paper (right) replaces the metal can in which banana flakes were formerly imported. Photo American Sealcone Corp.

characteristics over those which were seen before the war. It is true that salt has always been packaged in a container of this type, but the salt package possessed a very low degree of moisture-proofness and, therefore, this experience did not have a wide application.

Metal restrictions have resulted in many new uses of slip-top fibre cans with parchment or cellophane liners. These have been successful for shortenings and other materials that have a high fat content. The function of the liner is to prevent fat staining of the fibre-bodied can of the conventional style.

There are many instances where folding cartons have been used to replace a fibre-bodied or all-metal friction top can. By using a laminated or specially treated carton stock, it is possible, with careful fabrication and sealing, to make a siftproof package with good grease-proofness and moisture vapor proofness. Breakfast cocoa has recently appeared on the shelves in an unusual carton of this type which carries a friction plug in the top.

The bag-in-box

A packaging form which is carrying much of the burden resulting from conversion is the so-called bag-in-carton. This type of package is attractive in appearance and, by the combination of suitable liners and wrappers, is capable of a very high level of moisture vapor proofness. In these cases, the bag or liner is formed and inserted as a liner or as a pre-formed bag. Such a package is limited in its ability to hold high fat content foods by the seals and closure of the liner. Bags can be constructed with different functional properties for many jobs and it is possible by properly selecting a bag style and reinforcing it with plies of strong paper to use a bag alone for many purposes. The bag-in-carton can be used over a large weight range but the bag alone is finding much acceptance for very large sizes ranging from over 25 up to 100 pounds. Dessert powders, some of which formerly appeared in fibre cans with metal ends, are being packaged in bags-in-cartons. Commercial packages of baking powder are available in bags in five- and ten-pound sizes, and these too supplant fibre cans or all metal cans.

Even though we can expect limitations in the production of many papers and materials necessary to impart functional properties, there is no reason why the paper industry cannot successfully assume the burden which has been and will be imposed upon it by the food industry. Unquestionably sizes of containers will increase so that materials will be used more efficiently. The paper industry is faced with a grave responsibility to make all conversions on a sound and rational basis and it should not hesitate to admit its own limitations or inability to do specific jobs. Many conversions will doubtless be permanent and will point the way to new uses of paper in the post war period.

IN THE DRUG FIELD

During 1942 the drug and fine chemical industry has been turning to the use of paper as never before to solve its packaging problems. The industry has not been faced with basic shortages of manufacturing materials for necessary health items, and therefore the volume of packaging has not been curtailed, so that containers had to be made available constructed from non-critical materials.

It was not until the issuance of the M-126 and M-81 War Production Board orders that packagers began to feel the shortage of critical materials. True, aluminum had already disappeared as a container material, and rubber users were being inconvenienced, but large volumes of tinplate and blackplate cans were still being used. The "M" orders mentioned came as the first major conversion problem for the industry. Talcum and tooth powder cans, tablet boxes, metal adhesive spools, most cans for liquid products and many others were affected. Later came conservation orders on metal and plastic closures, imposing additional problems, many of which have been answered by the use of paper.

Paper packages are by no means new to the drug and fine chemical field. Most packagers have always used

quantities of folding boxes, and many have used fibre cans with metal or paper ends. They turned to their paper suppliers and these are some of the things they got:

Tooth powder cans are on the market in various sizes and styles which are doing an excellent job. Constructed with inset paper bottoms and rotating paper tops, filled and closed mechanically, they are "delivering the goods." The same type package, with sifter top, has replaced metal cans for toilet powders.

Paper boxes carry the load

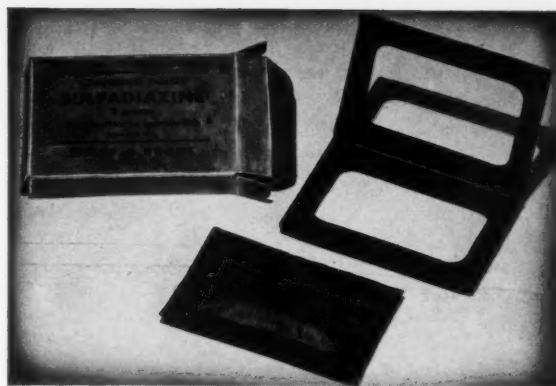
Tablet boxes, posing a different problem, have been solved with different techniques. Aspirin packagers have turned to folding or set-up boxes and, in one instance, to the use of heat-sealed cellophane bags, with a convenient dispensing feature. Throat lozenge products are being marketed in set-up and folding paper boxes.

Powdered household drugs needed consideration with the elimination of the bag-lined slip cover can. In some instances packers converted to glass packages, but, in at least one instance, the conversion was to bag-lined folding boxes, utilizing a tuck top and bottom carton, with special wall strength provided by a liner of boxboard. The same type package, with laminated, heat-sealed bag, is being used by some companies for deliquescent and hygroscopic chemicals. Equally serviceable and efficient are the set-up paper boxes with or without bag liners which are being used for such commodities.

Surgical dressing manufacturers have also turned to paper to replace metal. Slide-cover and slip-cover folding and set-up boxes again have been called upon, without loss of sales appeal or packaging efficiency. Adhesive tape spools are also being successfully manufactured from paper.

Paper closures, too, are to be expected in the drug and chemical field during 1943. Considerable progress has already been made in production of drawn and otherwise formed paper screw caps, and various producers are tooling their plants for additional sizes. Most of these closures simulate double shell caps in appearance, and have adequately strong threads for use on dry product packages.

Cleverly designed folding paper boxes displace the former pocket size metal containers for medicines. Photo McKesson & Robbins Inc.



Soldiers on the front line carry this sturdy paper-wrapped emergency package of sulfa-drugs. Photo Sharp & Dohme.

Drug and chemical manufacturers have been obliged to eliminate the use of steel drums for many items. These are being packaged either in multi-wall paper shipping sacks or in fibre drums. For products such as lanolin these drums have special wall constructions giving satisfactory greaseproofness.

Paper has been playing a new and important role in the packaging of medical supplies for our armed forces. The sulfa drugs are being provided to the individual soldier and sailor in several small individual-dose paper packages. One of these is a double envelope containing five grams sulfanilamide, which is sterilized after filling. Another all-paper unit contains tablets to be taken after an injury; the tablets are heat-sealed into a moisture-proof paper envelope which is enclosed in a husky folding carton.

Metal-ended paper canisters have replaced all-metal cans for the packaging of many medical supply items used in large quantities, such as epsom salts. These fibre-bodied cans have special moisture-resistant wall constructions, incorporating layers of asphalt, glassine, wax and other barriers, and are made with lock-top, friction-plug or slip-cover construction. This type merchandise will be packed in the new weather-proof "V" board paper boxes for overseas shipment, replacing wooden boxes formerly used.

There still remain some fields for paper container producers to conquer. Notably lacking as yet is a commercially satisfactory paper container for liquids. It is to be expected that 1943 will bring forth some very interesting developments along this line. Strides are being made with various types of folding cartons with heat-sealed bottoms and seams and ingenious pouring devices.

The paper industry and paper package converters have done an excellent, workmanlike job under pressure to make paper packages for new applications in the drug and fine chemical field. Doubtless 1943 will bring new problems, and probably a great many interesting solutions. American industry is learning to do a lot more packaging with paper than had been imagined possible, and in doing so is making a real contribution toward a speedy end of the war.

IN THE COSMETIC FIELD

Cosmetic manufacturers now operate under many restrictions caused by the withdrawal of raw materials previously readily available. This goes for every form of operation from the adoption of new formulas which stretch available raw materials, to the development of packages and containers which will not require critical packaging materials. The industry accepts these problems and makes the same response that other loyal Americans in every phase of endeavor have made. The consumer too is ready and willing to accept any changes in packaging that will help the war effort.

Paper packages are not new in the cosmetic field. We have had paper face powder boxes, paper rouge boxes and paper-covered boxes of many other types for years, but paper lipstick containers, paper rouge plaques, jar closures, and jars are new. Their development to the point of practical use shows how ingeniously we can tackle the job when we are faced with the challenge as severe as the present one.

Closures are a headache for cosmetic people. In the first place, the various formulas involved require many constituents which readily attack paper. Alcohol of one type or another, and in considerable volume, is used in so many cosmetics. The various emollients used in lotions also make the development of an adequate paper closure a problem.

The manufacturer and the consumer have said goodbye to any more perfume and cologne atomizers until victory. It seems difficult to believe that native ingenuity will be able to develop a paper substitute for this purpose.

When it comes to containers for tooth powders, talc, dusting powder and baby talc, we have been able to utilize paper very well. The first fibre cans that were developed used metal and then plastics for sifting or pouring arrangements. More recent containers, following the

Paper packaging of lipstick—even to the device which raises the stick—is practicable. Photo Luxor, Ltd.



A deodorant powder is now marketed in a paper bellows-box instead of the former package which involved the use of rubber. Photo Waterbury Paper Box Co.

increasing "tightness" of the plastic situation, have been produced entirely of paper, revolving top and all.

We still have opal glass jars but the day when the cosmetic manufacturer could order unlimited quantities of jars, or anything else, is over. (Strict adherence to the regulations on inventory control prohibits extensive purchase-for-inventory. This has resulted in reduced stocks of critical materials for which substitutes must be developed—the sooner, the better.)

The industry faces a general standardization of jar sizes so that jars and closures for creams and ointments will be uniform. Development work in the production of this type paper container has been successful. Box manufacturers all over the country are producing untold millions of specially treated paper containers for salves, ointments, shoe polish etc., for the government. Their experiments have also included work with the various types of creams manufactured by the cosmetic industry. It is comforting to know it will be possible to pack creams in special paper containers should further restrictions require it.

The cosmetic manufacturer hears of substitute cream jar closures on every side. Wood, pottery and glass are mentioned but the hue and cry is for a closure as satisfactory as the metal and as inexpensive. Wood pulp "pressed" or "molded" may provide the answer. Paper treated with a moisture-proof, greaseproof adhesive looks like a practical possibility, too. In fact, one box manufacturer has had a cold cream packaged in this type "jar" and closure under test for many months and it is still standing up.

Since the need for substitute closures for cream is so great and so universal, it would seem that a series of joint inter-industry conferences would facilitate matters greatly. Every one concerned—the jar producer, the paper manufacturer, the box maker—is besieged by not only the cosmetic firms but by every manufacturer with a closure problem, with requests for adequate substitute closures. No one firm could investigate every inquiry and it is obvious that duplication of effort must be common. Some factors are interested in formation of a pool where the problems of combining these materials could be discussed with attention to the interrelated phases of such closure production.

The box people can make paper jar caps to fit the thread of present opal jars but it is said there is difficulty in making a good "bead." They maintain they could construct a more efficient closure if the jar molds were slightly altered. It seems the thread on the ordinary opal jar is too deep. Were it more shallow, a better paper closure could be made. These are factors the inter-industry conferences could and would iron out.

In some experiments recently conducted in the Middle West, the jar manufacturer removed the jar thread altogether. He made the side of the jar straight for a short distance, then extended it about $\frac{1}{8}$ in. The box maker produced a closure similar in character to a face powder box top. The wrap was folded in, thicker at the under edge. This closure fits snugly over the smooth-sided jar. The jar's "bulge" gave it just enough purchase so that the closure seemed to snap on. The thicker under-edge of the closure fitted under the extended side of the jar. Those who made the experiment said this looked like a practical solution and an improvement over the paper closures made for regular jar threads.

Future bath salts packaging can well be confined to the fibre can field which makes a most satisfactory container.

Fine perfumes will more likely remain in all-glass packaging. Just how far development of substitute paper paste, perfume, paper stick cologne and paper powder sachet containers will go is still unpredictable. There are serious obstacles here—the presence of volatile essential oils and alcohol contributes to the problem.

With all the new emphasis put on them, the improvement of the appearance of paper rouge containers is most noticeable. The wood pulp people and those working with other types of impregnated board are doing all they can to work out a satisfactory substitute for the rouge plaque. Their work to date shows sufficient promise that it seems safe to prophesy the completion of this new use for paper.

Among the most interesting new uses for paper is the all-paper lipstick container. Before the present limitations, the paper lip pomade container was the very rare exception to the otherwise metal or plastic case. Today, the paper lipstick container is an accepted fact. The new ones sell readily, and refills are available.

Even the plastic pancake make-up container has been converted to paper. This was a job. It was necessary to produce a base that would withstand the moisture bound to remain in the container after the product had been used. But this, too, has been "licked." One of the best-known box makers in the country is now making pancake make-up containers whose paper bases are moisture-proof.

So far the picture of new uses for paper in cosmetic packaging has been fairly rosy. To some it may appear most definitely on the optimistic side. However, there is one thought that must be included before we close the discussion. Paper which was thought to be among the "free" materials has been getting in the limelight of critical materials these recent months. Production of paper and board was curtailed early in the year by the

WPB. We are on the way to the development of practical conversion from metal and plastics to the new use of paper containers. How far we go or how permanent the changes are, remains to be seen. How much we utilize them in the industry now will be controlled by the amount of paper permitted for use by the makers of cosmetics.

IN WAR PACKAGING

The war uses for paper are so ramified that it is impossible to account for more than a few of them.

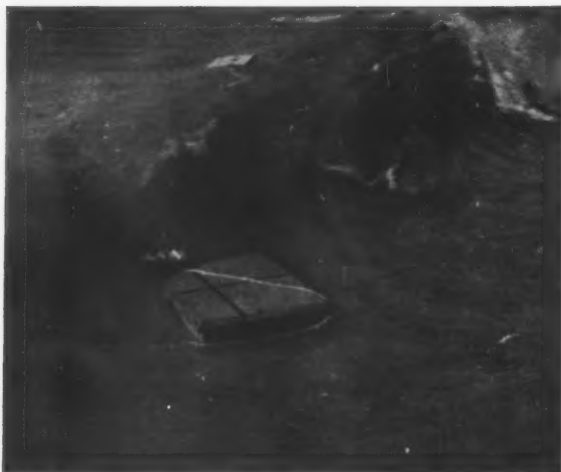
Two factors have largely been responsible for the accelerated application of paper. The first is tied in with the enormous war production program and its increasing demand for paper as a servicing and protection item. The second is the need for substitutes to fill in the gaps created by shortages of certain critical raw materials.

One of the outstanding war packaging jobs is the overseas shipping container, frequently referred to as the "V-Box."* While paper boxes have long been employed in export shipping, they failed sadly to meet the use requirements of modern warfare. To perform satisfactorily, and to deliver the goods to our armed services and allies, a container must carry and protect its contents under all circumstances. This means that the container must endure prolonged exposure to weather. And it means also that the container must stand up under hours of immersion and abrading in a seething, turbulent surf. At one point, the objective seemed so difficult that some believed a satisfactory paper box could not be made. The only thing that would work, they said, is a wooden container. If there had been enough wood, the problem might have ended there. But wood was not sufficiently available. Furthermore, it was worth shooting at for the savings in metal and shipping space that would result from a paper box. Experiments continued with variations in wall thickness, with different mixtures of adhesive and adjustments of laminating equipment. The result is the V-Box.

There are three broad classes of V-Boxes with specifications that are calculated to meet various types of shipping. Outstanding in its requirements is the top specification which calls, among other things, for a dry bursting strength of 750 lbs. and a wet burst (after 24 hours' immersion) of over 500 lbs. The box calipers 100 points. It is stitched, and wears an outer sleeve of the same paper-board of which the box is made. Composed of four or five plies, it usually is laminated with a water-proof adhesive made of urea, formaldehyde and starch. In some instances, internal plies have been treated with asphalt. The container is taking several hundreds of thousand tons of paperboard annually and carries both ordnance and subsistence materials.

An important conservation of metal has been achieved by the development of impregnated chipboard bomb rings. Two of these rings go around every aerial bomb. They protect the bomb and facilitate its handling up to the point of loading the plane. Previously made en-

* See diagram and specifications in chapter on Shipping, page 484.



Immersion tests subject shipping containers to hours of buffeting in the surf before they are accepted for military use. Photo Robert Gair Co. Inc.

tirely of steel, the new rings contain a minimum amount of metal. The resiliency of the paperboard ring enables it to do a better job of protection. Metal saved is expected to exceed 100,000 tons annually.

Other savings through paper

The folding and set-up box industry has many packaging conversions to its credit. Close to the consumer is the work which has been done in switching tobacco from metal to paper. It is reported that the elimination of cigarette tins and tobacco cans will save around 40,000 tons of metal yearly. An ingenious folding box has been developed for handling frozen eggs. First aid kits, battery boxes, tote trays and new methods for handling radio parts have also come from this industry. In process are some interesting experiments having as their objective the substitution of paper fins for the metal fins ordinarily used on incendiary bombs.

One box plant has discovered how to laminate a lightweight asbestos "paper" to corrugated kraft board. The product has been approved by insurance underwriters for the construction of hot air ducts in heating plants. Installations already have been made. Demand far exceeds supply. Substantial quantities of metal are saved, and the opportunities which exist in both the industrial and housing fields for a product like this should be manifest.

The preparation of new rations for the Army, especially powdered and dehydrated foods, has imposed many new packaging problems. Much of the development work has centered at the Subsistence Laboratory of the Quartermaster Corps in Chicago. A high premium has been placed upon moistureproof barriers, and there has been a continuous search for papers that will meet specifications. Such a high degree of imperviousness is required, however, that only a few combinations have been considered adequate thus far. Best results have been obtained with "compound" sheets where combinations of paper, or of paper and cellophane or lead foil, are laminated on a functional basis, with each layer contributing

its particular advantages to the final product. This approach has given good protection against water-vapor transmission, waterproofness, greaseproofness, flexibility and protection against odors, light and insect infestation.

In addition to their application in subsistence packaging, the above papers have been used to advantage by the Air Corps, Signal Corps, Medical Corps and Ordnance. Frequently made up into bags or envelopes, the laminates are used either as an interior protection within an outer casing or as a wrapper around a box carrying the packaged items. The latter technique is used especially when there is a possibility of abrading or puncturing the sheet by ingredients having sharp edges or corners.

Ordnance has been one of the most significant consumers of wrapping or packaging papers. Requirements are exacting in that the papers must be highly greaseproof, non-corrosive and flexible over a wide range of temperatures. In addition, good strength and resistance to puncture are important. Shell containers and ammunition boxes have consumed prodigious quantities of paperboard. There have been interesting developments in folding cartons for handling cartridges.

The Surgeon General's office has been confronted with many unique packaging problems. In some cases, impervious papers are required. Examples are found in the handling of ointments, salves, plaster of paris, emergency kits and bandages. In other instances, the issue is primarily one of protecting fragile instruments or materials. Interesting along this line is the technique used for handling blood plasma.

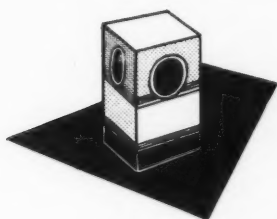
Much progress has been made in the development of wet strengthening techniques. This work has been applied to good advantage in many war uses for paper. One of the most dramatic uses for papers of this type is in the map field. Modern warfare with its highly mobile small units depends upon rugged maps. The value of papers that can be used in the pouring rain, or immersed in water or washed clean of blood, grease and other soilage, should be apparent. Also significant are the new fluorescent maps. These can be read under red light of such low intensity that the reader's position is not flashed to the enemy and, more important, the eye of the observer does not lose its adaptation to darkness.

The molded fiber industry has come into its own in the war. Special cups, flashlight cases, clock cases, instrument cases, flare spacers, walkie-talkie battery cases, helmets, hand grenades, special shell cases and canisters, are only a few examples. Use of new resins has made it possible to achieve characteristics that are necessary for these specialized applications.

This has been a most incomplete and unsatisfactory summary of "war uses for paper." Too much has been omitted, and one fears that the subject has been done a real injustice. Suffice it to say that the war uses are manifold. Many new techniques have arisen out of these developments. Many of the newer things will find their place in the post-war economy and the pulp and paper industry will bear an even more significant relation to civilian life than it did in the pre-war era.



Keeping Ahead **OF WARTIME DEMANDS**



LENDING definite aid to troubled packagers is an A.C.M. specialty. New cartonboard coatings . . . successful new containers to replace those made from tin and other vital materials . . . have been developed by our research staff.

Enlarged laboratory, engineering, designing and construction departments, together with coordinated board mill and carton plant operations assure speedy, practical solutions to your packaging problems.

Take advantage of our extensive facilities. Discover how efficiently we are prepared to "keep ahead of war time demands"!

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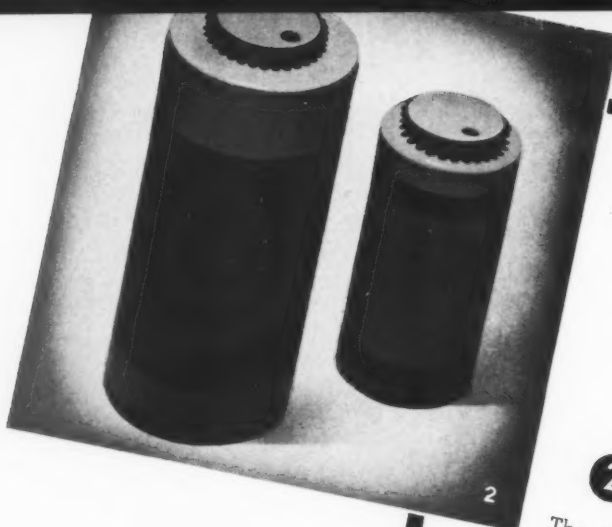
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CARTONS AND CARTON BOARD

OUR
CUSTOMERS
ARE 4 UP
ON
PRIORITIES



2 PAPER SIFTER-TOP CAN:

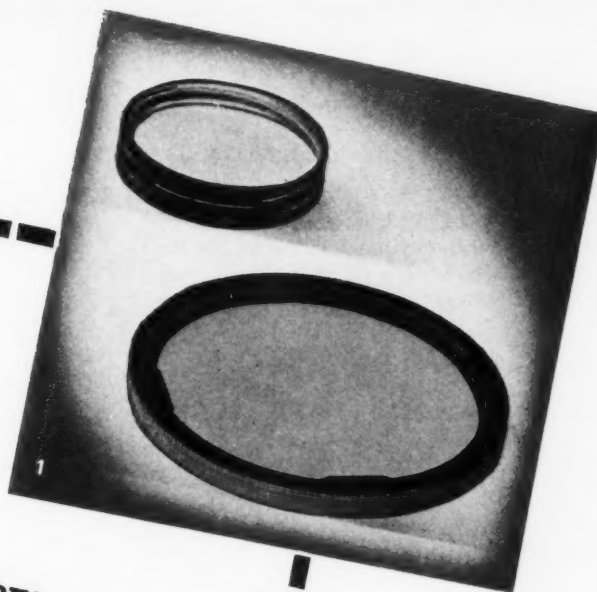
The tooth-powders and talcum powders, that have such a large market in this country, almost had no vehicle for getting to market as the WPB closed in on their packages. Would the public stand for complete elimination of the convenient dispensing container that had become an integral part of their lives? That is one question that did not have to be answered by Burt customers, because this new development gave them just what they needed to package their goods: a sturdy, sifter-top can made completely of non-strategic, available paper and board.

3 PAPER LIPSTICK:

It's no secret that former lipstick container manufacturers are engaged in much more martial production for the duration, that the metals they used to package war paint in are now flying at the axis. But surveys show that lipstick is the **single most essential item in feminine morale!** Keeping our lady mechanics beautiful is another help to winning the war, besides saving markets for the industry that had spent millions in building them up. Burt's lipstick container made of paper and other non-strategic materials looks as good, weighs less and has the propel-repel feature of the unobtainable metal cases. Acceptable? And how!



These developments were honored in the first wartime All-American Package Competition with a Special Award — the first ever to be given to a package producer—for basic development to help packagers meet the new needs of war.

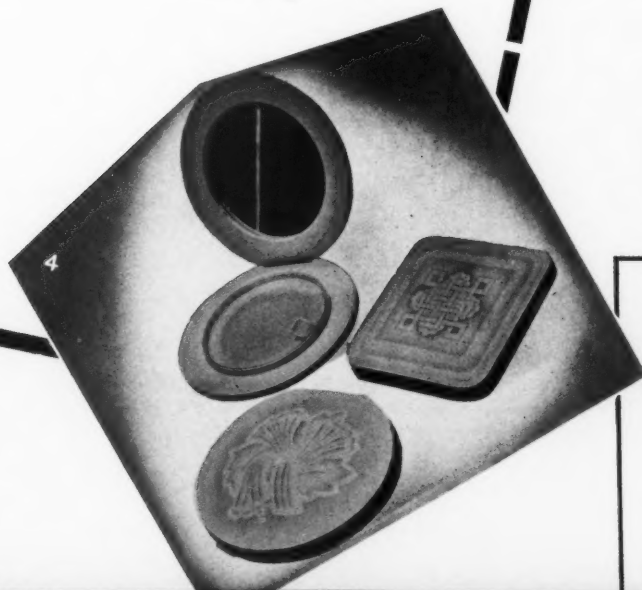


1 PAPER CLOSURES:

Here are completely non-strategic closures that reached the packaging industries just as they had their backs to the wall, faced with the WPB order depriving them of metals. They saved the merchandising lives of many manufacturers, helped give the public the merchandise it wants and needs. They were developed by Burt engineers and manufactured automatically to meet the special situation imposed by war.

4 PAPER COMPACTS:

Another boost to the wartime morale of the feminine market and the cosmetic manufacturers comes via the Burt paper and board compact. It is a really engineered job, closes with a snap just like the former metal containers . . . another Burt development that both consumer and manufacturer are thankful for, a creative contribution to wartime packaging.



the 4 and YOU

These four developments are typical products of Burt packaging service that has long experience to back it up but is not bogged down with traditional techniques, that is large enough to fill the requirements of mass packagers yet provides for the needs of all. They indicate a basic creative attack on packaging problems that is as valuable to packagers in peace as in war. There are no obstacles to getting what you want when you come to a concern who knows how.

E. N. BURT COMPANY, INC.

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CANADIAN DIVISION: Dominion Paper Box Company, Ltd.
469-483 King Street, West, Toronto 2, Canada

Boxboard: Types and Selection

by Grafton Whiting

FOLDING cartons and set-up boxes are made from boxboard manufactured on a multi-cylinder paper machine. The function of this machine is to draw a film or web of fibres from each cylinder (usually 5 to 8 cylinders) and, by subsequent pressure, to form a compact sheet. Each cylinder turns in a vat supplied with the raw stock (about 1 per cent fibre and 99 per cent water) from which the board is to be made. This supply may consist of fibres reclaimed from waste paper, or of virgin pulp fibres, or a mixture of these according to the specifications of the board to be produced. The first and last cylinders form the two outside liners or surfaces of the board, while the remaining cylinders produce the filler, or inner plies. The thickness of each ranges from .002 of an inch upward, depending upon the adjustment of the machine.

Since any type of fibre may be furnished to the cylinders, and each cylinder forms a part of the construction of the board, a wide variety of boxboards can be made.

There are certain grades of board in common use for folding and set-up boxes, made of different materials and different thicknesses, dependent upon the size and style of the box and the use to which it will be put. The thickness or caliper is expressed in thousandths of an inch—termed "points"—and ranges from .012 to .065 of an inch.

Table 1 (below) lists these grades, together with the caliper range and in general the materials from which they are made. Waste papers, the chief source of raw material, are sorted into many classes, each commanding a different price, according to the fibre content. Papers containing strong, white fibres bring the highest price and from there, range downward to mixed papers, the

lowest class. Pulp, although the average use is less in volume, is an important element in many furnishes in producing the quality and surface effect required. There are three kinds of pulp in common use; namely, sulfate, sulfate or kraft, and groundwood. These may be unbleached or bleached and prices vary accordingly.

When the importation of European pulp was cut off in 1940 it was feared that the domestic and Canadian output would be insufficient to supply the market requirements. To meet this situation, the paperboard mills increased their usage of waste papers, particularly of the better grades, to substitute in part these reclaimed fibres for new pulp. Although no serious shortage occurred, this process was continued in 1941 and in 1942 with the result that less pulp and more waste paper stock than heretofore was used in the average furnish. However, this does not affect the tabulation of the materials used, but refers only to the relative amount of each that is required.

Boards

SOLID BOARDS: A general term indicating that the board is made of the same material throughout.

FILLED BOARDS: A board with inner plies of a stock different from that of the outer plies or liners.

PASTED BOARD: A board made of two or more sheets of board or of board and paper pasted together by a subsequent operation.

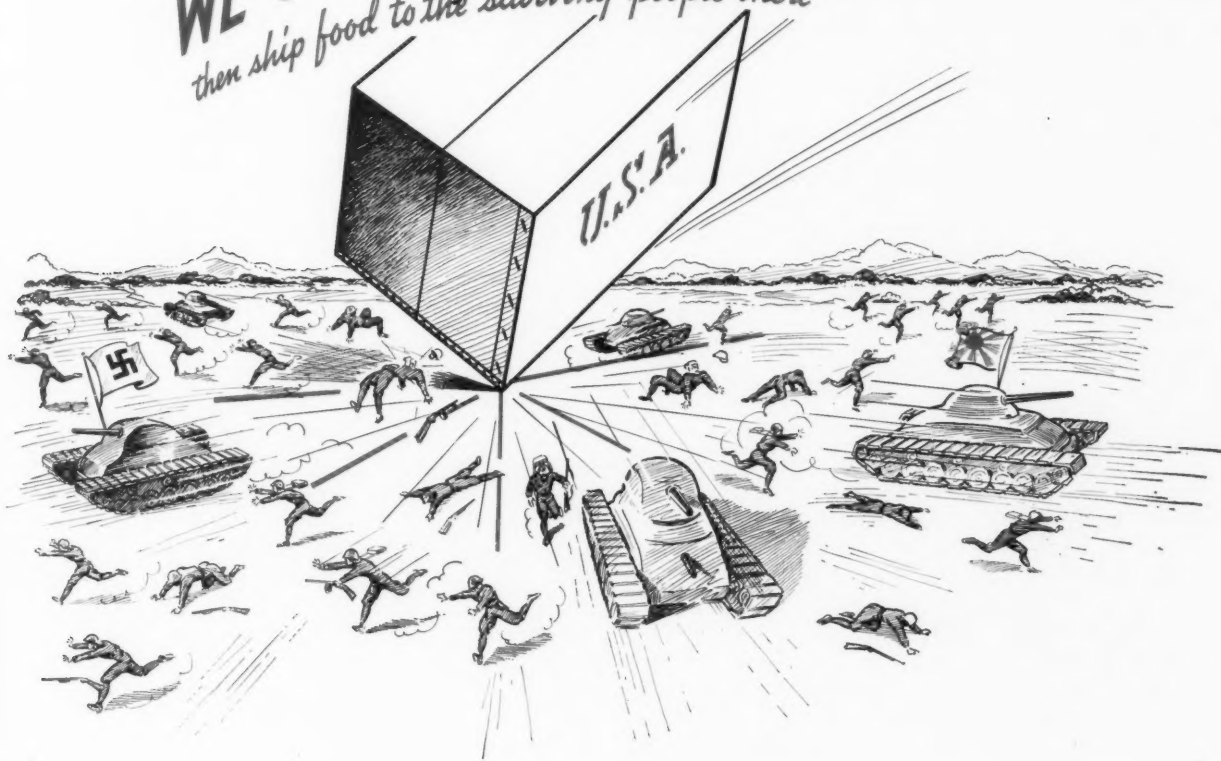
VAT LINED BOARD: A board made on a cylinder machine where the first or last cylinder vat is supplied with a quality of stock different from that in the other vats. Double vat lined board requires that both the first and last vats contain different stocks.

TABLE 1—Grades of Boxboard

GRADES	Caliper Range in Inches	FURNISH									Price Index
		Waste Papers Composed Principally of					Pulp			Clay	
		Mixed Papers	News	Ground wood	Sulphite Fibres	Old Ct. rs.	Sulphite	Kraft	Ground wood		
FOLDING											
Chip (bending)	.012-.050	x	x			x					110
Mist Gray Suit Board	.020-.040	x	x			x	x	x			130
Manila Lined Chip	.012-.050	x	x	x		x	x		x		130
Bleached Manila Lined Chip	.012-.050	x	x	x		x	x		x		140
Kraft Board	.012-.050							x			130
White Patent Coated News	.012-.028		x	x	x		x				160
Clay Coated Board	.012-.028		x		x		x			x	220
Bleached Sulphite Board	.016-.024						x				250
SET-UP											
Chip (non-bending)	.016-.065	x	x								100
News Vat Lined Chip	.016-.065	x	x			x					105
Filled News	.016-.065	x	x			x					110
Solid News	.016-.065		x								115
White Vat Lined Chip	.016-.065	x		x	x	x	x		x		130

NOTE: The proportion and selection of raw materials in a furnish may vary depending on availability of supply and quality required. Price index is based upon chip (non-bending) equal to 100%. The relation of other grades is only typical since the several materials entering into costs vary independently.

WE SHALL INVADE...
then ship food to the starving people there



ANOTHER chapter in the long story of American ingenuity and production is being written.

Solving the greatest supply problem in history, American goods and munitions are now moving to world battle fronts, giving our forces and those of our allies what it takes to deliver the knockout punch.

Much of this material is carried in efficient and inexpensive paperboard packaging. War-improved packaging is available to you — now.

THE OHIO BOXBOARD CO.

RITTMAN



OHIO

500 TONS DAILY

SALES OFFICES:

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Color

MANILA: A term used to indicate a color (yellowish) and appearance comparable to that formerly obtained when manila hemp (rope) was used.

BEATER COLORED: The coloring material is added to the paper stock before entering the cylinder vat, thus impregnating the whole ply.

CALENDER COLORED (or stained): The coloring material is applied to the surface of the board as it passes through the calender stack, thus coloring the top but not necessarily permeating throughout the ply.

Chemicals

Various chemicals, such as rosin and alum for sizing, are used in making boxboard to prevent the penetration of moisture. Starch is used for hardening and stiffening. Loading material, such as clay, is also used. Emulsions, such as asphalt for water-proofing, and dyes and pigments for procuring the desired color, are also employed. With these applied to the paper stock, any one or all of the plies may receive a specified treatment to suit individual requirements.

Finish

DRY FINISH: The finish obtained when board passes through calender stack without special treatment.

WET FINISH: The surface of the board is subjected to a water or steam bath in passing through the calendar, which gives it a smoother finish. This is somewhat similar to dampening cloth before pressing.

SURFACE TREATMENT: Treatment of the surface of the board may be made at the calender either before passing through the stacks or as some step in the operation. For example, silicate is applied to the board to prevent penetration of grease in the packaging of foods. Starch or other sizing is used to give a smoother finish for certain types of printing. Paraffin or wax is applied as a water-proofing agent where the board is to be used for the packaging of liquids or semi-liquids. It is common practice in folding-box plants to coat with paraffin or wax for this same purpose.

Standards

Standard rules and regulations have been adopted by the National Paperboard Association, representing the manufacturers of folding and set-up boxboards.

The basic facts for establishing the standards, and other information, were obtained from investigations of practices in large and small boxboard mills scattered over a wide area. Following this survey, conferences were held by makers of board, fabricators of folding and set-up boxes, and consumer organizations, and there a series of standard gauge lists was evolved; also a set of definitions which met with general approval. These gauge lists are identical with Simplified Practice Recommendation R44-36, entitled Box Board Thicknesses (United States Department of Commerce; effective December 31, 1936). The set of definitions and the gauge lists are as follows:

STANDARD SIZES: In all grades, a sheet 25 in. by 40 in., containing 1,000 sq. in.

Patent coated or manila boards (Lists 6 to 8) are also shown in sizes 24 in. by 36 in., containing 864 sq. in. and 28 in. by 44 in., containing 1,232 sq. in. The standard sizes are used as bases for all computations.

STANDARD PACKAGE: In patent coated or solid manila board, a ream of 500 sheets.

These grades are sometimes packed, for convenience, in fractions or multiples of a ream, depending upon the size of the sheet.

BUNDLE: A unit containing 50 lbs.

The quantity of sheets varies with the size and the caliper, but the weight of 50 lbs. of board is fixed.

REGULAR NUMBERS: The quantity of standard sized sheets (25 by 40) of boxboard to make a bundle of 50 lbs.

COUNT: The quantity of odd-sized sheets required to make a bundle.

For the standard size (25 by 40) the count would be identical with the Regular Number; therefore it has become the custom to use the term Count to apply only to odd-sized sheets and Regular Number to standard size. The count for an odd-sized sheet is found by dividing the area of the corresponding Regular Number by the number of square inches in the odd-sized sheet.

FINISH: Four standard finishes designated as Numbers 1 to 4, from lowest to highest.

The degree of finish is regulated by the pressure exerted on the calendars under which the board passes. The pressure determines the density of the sheet. The resulting surface is incidental, but it becomes smoother as calender pressure is increased.

No. 1—Light pressure: results in rough surface and low density. It gives large sheetage for its weight; i.e., greatest area to pound of board.

No. 2—Medium pressure: fair surface and sheetage. Popular for ordinary printing and general utility purposes.

No. 3—Heavy pressure: smooth surface and low sheetage. Used largely where better printing surface is required.

No. 4—Heaviest pressure: extra smooth and slick surface, dense body and firm compact fibres. It has the lowest sheetage.

Rough—Smooth: Where but two finishes are used, these relative terms designate light or heavy weight board in caliper points.

DIMENSIONS: Width in inches given first, then length.

Width is the measurement across the machine, i.e., space between knives in the slit. Length is always the measurement in the direction of the grain, i.e., space between cut-offs.

BENDING: Any board which, when properly scored and folded, shows no break in the outer fibres.

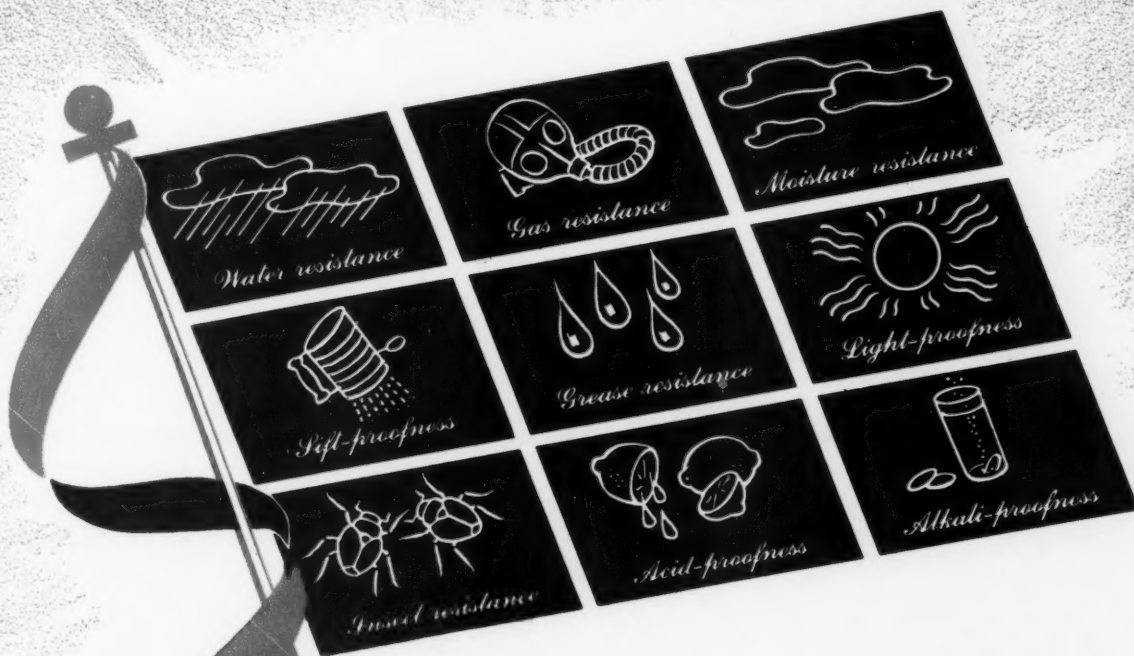
Gauge Lists

In the accompanying tables Gauge Lists 1 to 6 give in the first column the Regular Numbers or quantity of standard sized sheets in a bundle weighing 50 pounds.

WAR PACKAGES OF PAPERBOARD . . .

PRESERVE QUALITY • PROTECT HEALTH • SAVE METALS

• Conversion packaging is a tremendous challenge to converters, designers and manufacturers. Ridgelo boxboards offer some of the answers to this major problem. The qualities that can be provided with modern paperboards using laminations, coatings, impregnations of non-critical materials are these—



• In addition to the above important protective features, Ridgelo clay coated boxboard has the brightest color—obtained with the least critical materials. It uses less ink, fewer plates and a minimum of printed impressions for attractive results.

It's the war-time economy boxboard!

Ridgelo


CLAY COATED

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PROTECTIVE PACKAGING MATERIALS

MADE AT RIDGEFIELD, N. J. BY LOWE PAPER COMPANY

Printed on a Ridgelo clay coated cardboard, .008 white, two sides.



*Let us
place our facilities
at your disposal*

• Now the user of packages from tobacco to aspirin—from baking soda to shortening, may find a solution in paperboard. These adaptations will correlate with high speed filling equipment, prove lighter in weight, save space by their rectangular form, become even more convenient in consumer usage.

Get all the facts that research and experience are placing at your disposal today. Your problem may be highly specialized, but let us have it. One of our answers can be yours!

Ridgelo
CLAY COATED

**COATED AND SPECIALTY BOXBOARDS
FOR INDEPENDENT CONVERTERS**

MADE AT RIDGEFIELD, N. J. BY LOWE PAPER COMPANY

The figures in the other columns give the caliper (decimals of an inch) when made with the finish indicated.*

No. 1 Gauge List—Non-Bending Boards

1. Plain Strawboard.
2. Plain Chipboard.
3. Filled Wood Pulp.
4. Filled News Board.
5. Single News Vat-Lined Chip.
6. Single White Vat-Lined Chip.

Regular Number 50 Lb. Bdl.	FINISH				Weight per M Sq. Ft.
	1	2	3	4	
Quan.	Inch	Inch	Inch	Inch	Lbs.
35	.065	.061	.058	.052	206
40	.057	.054	.051	.046	180
45	.051	.048	.046	.041	160
50	.046	.043	.041	.037	144
55	.041	.038	.036	.033	131
60	.038	.035	.033	.030	120
65	.035	.032	.030	.028	111
70	.032	.030	.028	.026	103
75	.030	.028	.027	.024	96
80	.028	.026	.025	.023	90
85	.026	.024	.023	.022	85
90	.024	.022	.021	.020	90
95	.023	.021	.020	.018	76
100	.022	.020	.019	.017	72
110	.019	.018	.017	.016	65
120	.017	.016	.015	.014	60

No. 2 Gauge List—Bending Boards

1. Single Manila Lined Chip.
2. Bleached Manila Lined Chip.
3. Double Manila Lined Chip.
4. Colored Boxboard Chip Back.
5. Bending Chipboard.
6. Colored Suit Box Chip Back.
7. Mist Color Suit Box Chip Back.
8. Cracker Shell Board.
9. Solid Lute.
10. Any combination with Chip, News or Pulp Back.

Regular Number 50 Lb. Bdl.	FINISH				Weight per M Sq. Ft.
	1	2	3	4	
Quan.	Inch	Inch	Inch	Inch	Lbs.
40	.052	.049	.047	.045	180
45	.047	.045	.042	.040	160
50	.042	.040	.038	.036	144
55	.038	.036	.034	.032	131
60	.035	.033	.031	.029	120
65	.031	.030	.028	.026	111
70	.029	.028	.026	.024	103
75	.027	.026	.024	.023	96
80	.025	.024	.023	.021	90
85	.023	.022	.021	.019	85
90	.021	.020	.019	.018	80
95	.020	.019	.018	.017	76
100	.019	.018	.017	.016	72
105	.018	.017	.016	.015	69
110	.017	.016	.015	.014	65
120	.016	.015	.014	.013	60

No. 3 Gauge List—Solid News Solid Wood Pulp

Regular Number 50 Lb. Bdl.	FINISH				Weight per M Sq. Ft.
	1	2	3	4	
Quan.	Inch	Inch	Inch	Inch	Lbs.
40	.061	.058	.053	.049	180
45	.054	.052	.048	.043	160
50	.049	.047	.043	.039	144
55	.045	.043	.039	.035	131
60	.041	.039	.036	.032	120
65	.038	.036	.033	.030	111
70	.035	.033	.031	.028	103
75	.032	.031	.029	.026	96
80	.030	.029	.027	.024	90
85	.028	.027	.025	.023	85
90	.027	.025	.023	.021	80
95	.025	.024	.022	.020	76
100	.023	.022	.021	.019	72
110	.021	.020	.019	.017	65
120	.019	.018	.017	.015	60

* Published by courtesy of the National Paperboard Association.

Thus Gauge List No. 1, first line, column 1, shows Regular Number 35, meaning 35 standard sized sheets to the bundle. Column 2 gives the caliper of .065 in. as the thickness of No. 1 finish; column 3, .061 in. for No. 2 finish; and so on.

Gauge List 6 states the caliper in the first column, and to the right of it, the weight of a ream of 500 sheets. Three sizes of sheets are listed with the corresponding weights.

The weight per M Sq. Ft. is also shown on each list.

Special surfacings

Boxboard is taken from the paper machine either in rolls or in sheets, cut to specified size, and may be further processed to give a special type of surface. Where the equipment is so arranged, some of these operations may

No. 4 Gauge List—Pasted Chip

Regular Number 50 Lb. Bdl.	FINISH		Weight per M Sq. Ft.
	Rough	Smooth	
Quan.	Inch	Inch	Lbs.
10	.216	.206	720
15	.144	.138	480
20	.108	.103	360
25	.086	.081	288
30	.070	.065	240
35	.060	.058	206

No. 5 Gauge List—Pasted Solids News Board

Regular Number 50 Lb. Bdl.	FINISH		Weight per M Sq. Ft.
	Rough	Smooth	
Quan.	Inch	Inch	Lbs.
10	.233	.196	720
15	.156	.130	480
20	.117	.098	360
25	.094	.078	288
30	.078	.065	240
35	.066	.056	206

No. 6 Gauge List and Ream Weight Table Patent Coated and Solid Manila Board

1. Patent Coated, Solid Manila Back.
2. Patent Coated, News Back.
3. Patent Coated, News Center, Manila Back.
4. Patent Coated, Chip Back.
5. Patent Coated, Blue or Color Back.
6. Solid Manila Board.

Caliper of Individual Sheets	WEIGHT PER 500 SHEETS			Weight per M Sq. Ft.
	25 × 40 (1000 Sq. Ins.)	24 × 36 (864 Sq. Ins.)	28 × 24 (1232 Sq. Ins.)	
Inch	Lbs.	Lbs.	Lbs.	Lbs.
.011	178	154	219	51
.012	194	168	239	56
.013	211	182	260	61
.014	219	189	270	63
.015	226	195	278	65
.016	241	208	297	69
.018	266	230	328	77
.020	284	245	350	82
.022	306	264	377	88
.024	333	288	410	96
.026	361	312	445	104
.028	389	336	479	112
.030	417	360	514	120
.032	444	384	547	128
.034	472	408	582	136
.040	556	480	685	160

be continuous with the paper machine while others are treated in a separate division. Following is a description of some finishes:

CLAY COATED: Clay, with casein as an adhesive, is applied as a coating to boxboard and, with subsequent calendering, produces an excellent color and brightness. It is the highest standard grade of board and is used largely for the better quality of folding cartons.

GRAINED: An imitation oak, leather, marble, or other finish may be given to a boxboard by passing it through printing cylinders appropriately engraved.

LINED OR PASTED: Any boxboard may be pasted to an-

other or lined with a plain or fancy cover paper, parchment, glassine, or other material, either in the roll or in sheet form. Asphalt, properly prepared, or other adhesives, may be used to make the board practically waterproof. Pasted board may be built up to any desired thickness and made to serve a number of uses.

Table 2 shows general types of boxes (column headings) and the grades of board (at the left) from which they may be made. Such a statement is necessarily based upon averages, since styles of boxes vary the same as styles in clothing, and poorer or better grades may be supplied to meet the desire of the buyer.

TABLE 2—Types of Boxes

BOXBOARD GRADES	Butter Boxes	Candy Boxes	Cereal Cartons	Cigarette Cartons	Cosmetics	Drugs (bottled)	Dried Fruit Cartons	Eggs (local delivery)	Envelopes (Stationery)	S-Cent Candies	Florists' Boxes	Frozen Foods	Hardware	Ice Cream	Jewelry Boxes	Liquor (bottled) Cartons	Milk Bottles	Salt Cartons	Shoe Boxes	Soap (flakes)	Sausages, Bacon, etc.	Suit Boxes	Stocking Boxes	Tooth Paste Cartons	Vegetable and Fruit Cartons
Chip (bending)		x	x					x	x		x											x			b
Mist Gray Suit Board																									
Manila Lined Chip						x	x	x													a	a			
Bleached Manila Lined Chip				x	x	x	x	x								c			b	x	a	a			b
Kraft Board											x												x		
White Patent Coated News				x	x	x	x														a	a			
Clay Coated Board				x	x	x	x														a	a			
Bleached Sulphite Board	a		x									b		b	x						a	a			
Chip (non-bending)		c									c								c	c					
News Vat Lined Chip			x					x	x	x			x										c		x
Filled News						x									x										
Solid News								x	c																
White Vat Lined Chip	c				c										c										

a—grease proof, b—water proof, c—lined with cover paper.

NOTE: The boxboard selected for any type of product may vary from a high to a low grade depending upon the service required of it, the price, and the degree to which the sales appeal in the appearance of the package is a factor in the merchandising policy.

Folding Box Directives

by A. E. Murphy

GOVERNMENT regulations so far have not provided for any drastic eliminations of folding boxes, most of the regulations limiting the caliper or grade of board to be used for certain purposes and in some cases limiting the number of sizes that can be made. Retail boxes are limited in 1943 to 65 per cent of the tonnage used during the corresponding quarters in 1941. Retail boxes for packaging clothing, laundry or flowers cannot be made of board containing any virgin pulp or any metal. This naturally will cheapen the quality of retail boxes. Holiday boxes are allowed, provided no more board, nor board containing a higher pulp content, is used than is contained in the usual commercial box.

Order No. L-239, dated January 8, 1943, and amendments prohibit the use of double-lined folding boxboard unless for packaging wet or oily foods, or when the use of a virgin wood pulp liner is essential in order to deliver the packaged contents in usable condition. They also prohibit the manufacture of any box after January 8 if any virgin pulp is contained in the following list of boards:

plain chipboard, filled news board, single news vat-lined chip, bending chipboard, colored suit box chip back, solid jute, cracker shell board or solid news.

Dummy boxes for display purposes are forbidden. Further, the order specifically states that it does not apply to boxes manufactured to meet the packaging specifications of the various Government agencies which make purchases for the Army, Navy and Lend-Lease supplies.

The order contains five schedules presenting very detailed regulations covering boxes for (1) foods, (2) beverages and tobacco, (3) retail boxes, (4) boxes for paper products and (5) sporting goods boxes. These schedules should be carefully consulted by anyone in the fields mentioned.

Other restrictions will be issued from time to time tending toward the reduction of virgin pulp content in folding boxboard and a general lowering of standards in the quality of boxes, as long as the war continues.



CAMBRIDGE CONTAINERS GET TOUGH..














YES SIR! "PARTY CLOTHES"
AT CAMBRIDGE.



ARE OUT



THE RESEARCH WHICH DEVELOPED THEM
IS NOW TURNING OUT   "TOUGH GUYS!"

WHETHER IT'S A  FOR A  FOR MA-
KING A  FOR A  FOR THE NAVY, OR A
 FOR AN  FOR THE  AIR FORCE, OR A
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 WAR INDUSTRY, CAMBRIDGE CON-
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CAMBRIDGE
Containers

CAMBRIDGE PAPER BOX CO. CAMBRIDGE MASSACHUSETTS
SET-UP BOXES • PAPER CANS • LABELS AND ALLIED PRODUCTS

PACKAGING CATALOG 81

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Chip (bending)	x	x						x	x		x														
Mist Gray Suit Board																									
Manila Lined Chip						x	x																		
Bleached Manila Lined Chip			x	x		x	b	x		x								b			a	a			
Kraft Board																									
White Patent Coated News			x	x		x					x										a	a	x		
Clay Coated Board				x	x	x															a	a			
Bleached Sulphite Board	a	x										b		b	x						a	a			
Chip (non-bending)		c									c						b								
News Vat Lined Chip			x					x	x	x			x					c		c					
Filled News					x										x										
Solid News								x	c				x												
White Vat Lined Chip	c				c										c										

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




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PACKAGING CATALOG 81

Folding and Display Cartons

THE most notable characteristic of the folding carton or folding paper box is its infinite variety. Literally hundreds of variations in style and construction have been developed to meet the merchandising needs of the great assortment of products packaged in these containers. However, the 49 illustrations in this section cover all the important styles. Because of patent restrictions not all of these can be manufactured by any one company. Patented cartons have been so designated, and information on the patent for any given box can be procured from the regular box manufacturers.

In addition to styles in construction, other factors offer the user of cartons a wide choice. Board, for example, comes in a variety of grades, colors and thicknesses, as described elsewhere in this catalog. The carton may be printed in a number of colors by either letterpress or lithography. Special treatments either of the board or of the printed carton may give it specially desired characteristics. Varnish, lacquer, paraffin or cellulose film may be applied or the board may be embossed. The manufacturer of cartons is in a position to explain these processes and advantages in all details and to recommend desirable decorations.

Specification data

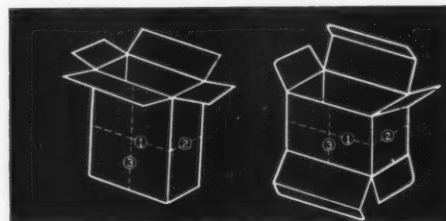
Purchasers can avoid much trouble by giving complete information at the earliest opportunity. The following points should be specified:

- (a) Stock: Specific description of type of board to be utilized
- (b) Caliper or thickness of the board
- (c) Dimensions: This, of course, is of vital importance. The proper method is explained under "Basic Styles" below
- (d) Engravings (whether furnished by purchaser, on hand, or to be made and billed as an extra charge by the box maker)
- (e) Colors: Specific naming of colors, preferably by some one of the standard systems, with mention of any peculiarities in use, such as fastness to sunlight or exposure to alkalis
- (f) Printing (whether letterpress or lithography)
- (g) Copy and proofs (including opportunity to check them before final printing)
- (h) Surface protection (i.e., varnishing, lacquering)
- (i) Packing and method of marking container to facilitate inventory and factory re-use
- (j) Delivery or shipping instructions

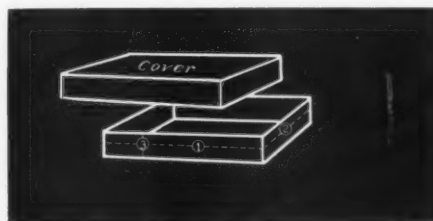
Basic styles

All folding boxes are derived from three basic types as illustrated below; the numbers on each diagram show the proper method and order of specifying dimensions. This method is recommended by the Folding Paper Box Association of America. All measurements should be from center of crease to center of crease:

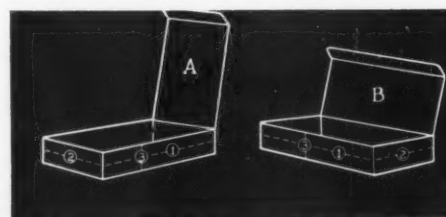
A. End opening: Basically a tube with one or both ends folded and sealed, locked or tucked to form closure.



B. Tray: A container, open on one plane, formed by folding up a sheet of board to make side panels; then gluing or locking the corners in place. Most two-piece boxes are two trays fitted together.



C. Top opening: Similar to the tray except that one side panel is extended and folded over to cover the open plane; it may be tucked, locked or glued to form the closure.



Each of the illustrations on the following pages comprises two panels. At the right is the photograph of a completed carton, exactly as it would appear in use. At the left is a photo-diagram of the same carton, flat and unprinted, showing its construction and proportions. The solid lines indicate lines for scoring edges; dotted lines indicate perforations or scores intended for tearing or opening of the container; cross hatching indicates glued seams. All diagrams are photographed against a one-inch scale.

The various styles are arranged under the three classes described above. In addition, there are illustrated some two-piece boxes, each of a different basic type; several styles of carriers for bottled beverages; and a number of display stands.

Watch Boxes

Hair Brush Boxes

Nail Polish Boxes

Perfume Boxes

Round Powder Boxes

Fountain Pen Boxes

Razor Boxes

Silverware Boxes

Playing Card Boxes

Writing Paper Boxes

Counter Displays

Smoking Pipe Boxes

Soap Boxes

Belt & Buckle Boxes

Jewelry Boxes

Thread Boxes

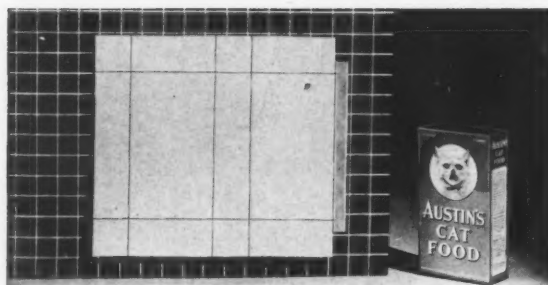
Let "WATERBURY" Make Your Boxes

THE WATERBURY PAPER BOX CO.

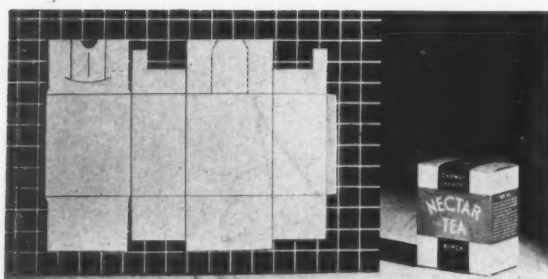
Factory at: WATERBURY, CONNECTICUT

New York City Office: 30 ROCKEFELLER PLAZA

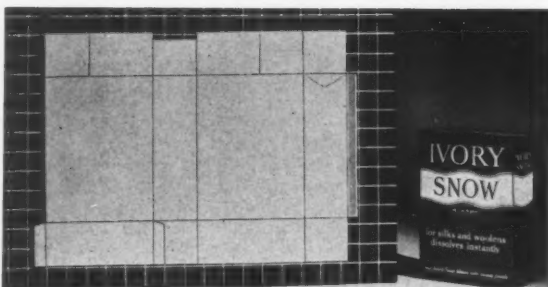
CLASS A



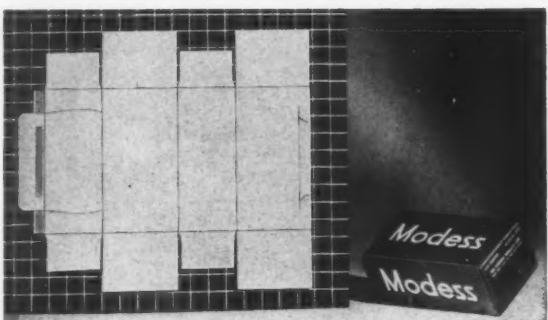
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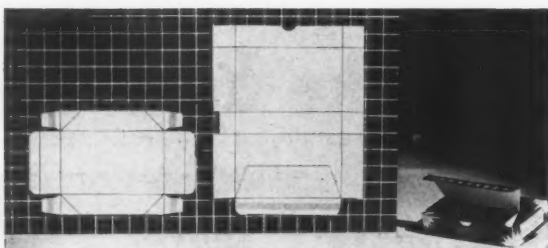
2



3



4



5

1. SEAL END CARTON. The most popular style carton for packing flour, cereals, sugar, salt, teas, coffees, spices, soap powders and a wide variety of products. Readily packed on high-speed automatic machinery but difficult to seal by hand.

2. SEAL END CARTON WITH POURING SPOUT. Seal end carton, same construction as No. 1 with the additional feature of the patented pouring spout. This pouring spout makes it possible to dispense contents easily without spilling and affords a means of re-closing.

3. SEAL END CARTON for automatic packing and sealing. It is similar to No. 1 except that it has incorporated in its construction additional flaps on the bottom of the carton to prevent sifting. This carton is particularly suited for products which are milled or pulverized to such a degree that particles would sift through the regular seal end carton. This carton also has a unique pouring spout, which is formed by breaking the perforations in the top of the side panel. Patented.

4. SEAL END BROADSIDE OPENER STYLE. An interesting development in a seal end carton which permits inexpensive, automatic filling through the ends of the carton which are later securely sealed. Carton is opened on the broad side, hence the name "Broadside Opener." Patented.

5. TWO-PIECE BROADSIDE OPENER. This is a variation of style No. 4 and is primarily used for the packaging of small pieces such as cube sugar. The individual pieces are first packed into the tray which is then easily inserted through the end of the outer carton. The outer carton is sealed automatically. The consumer can readily open the carton by breaking the spotted glue seam and tearing perforations. The container can be re-closed by the consumer by treating the hinged opening as an ordinary tuck flap. Patented.

Lick your
WARTIME PACKAGING PROBLEM
with these features!



**GREASE-
PROOF**



**FURNISHES
POISON
GAS
PROTECTION**

(applications should be submitted
to Government agencies
for approval)



**WATER-PROOF
and MOISTURE-
RESISTANT**



**DOES
NOT
SHRINK**

**MEETS
REQUIREMENTS
OF B.A.I.
(for meats)**



**PROTECTS
AGAINST
MOLD, GERMS
and
INFESTATION**



**DOES NOT DRY
OUT OR BECOME
BRITTLE WITH
AGE**



**Has
LOW PERMEABILITY
for oxygen and nitrogen;
is permeable to carbon
dioxide**



**CEMENTS
EASILY AND
PERMANENTLY**

**NOT AFFECTED BY
EXTREMES OF
TEMPERATURE
OR
HUMIDITY**



Suggestions—

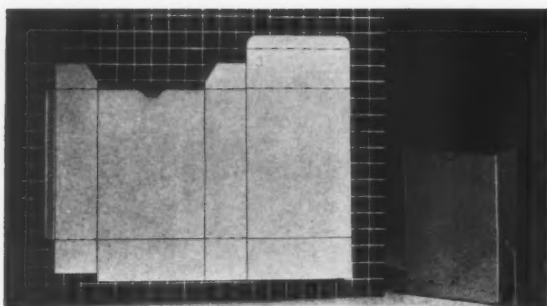
To replace cans: fibre cartons lined with grease-proof, water-proof Lumarith. To package tank parts and plane parts: grease-proof Lumarith combined with other materials. For special protection: Lumarith laminated in combination with other materials provides a grease-proof, water-proof, vapor-proof guard. Want suggestions for your problem? Write today.

LUMARITH

REG. U. S. PAT. OFF.

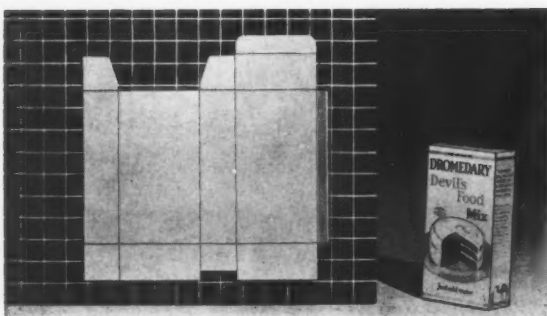
CELANESE CELLULOID CORPORATION

Celanese Celluloid Corporation, 180 Madison Ave., New York City, a division of Celanese Corporation of America Sole Producer of Celluloid* (cellulose nitrate plastics, film base and dopes) . . . Lumarith* (cellulose acetate plastics, film base, insulating, laminating and transparent packaging material and dopes) . . . Lumarith* E. C. (ethyl cellulose molding materials) . . . *Trademarks Reg. U. S. Pat. Off. . . . Representatives: Dayton, Chicago, St. Louis, Detroit, San Francisco, Los Angeles, Washington, D. C., Leominster, Montreal, Toronto.



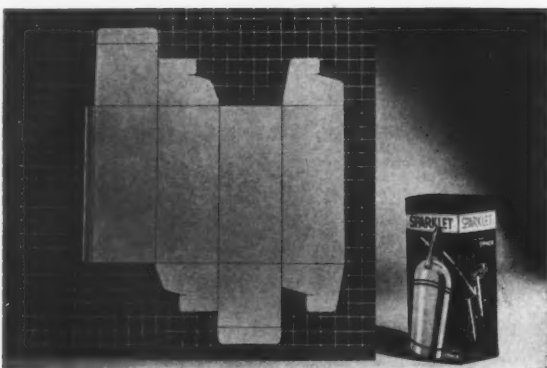
6

6. TUCK TOP SEAL BOTTOM SHELL WITH TIGHT WRAP. Consists of a plain shell, often made of chip board, completely covered by a printed wrapper. Widely used for cereals and crackers. Requires automatic machine equipment. Outer wrapper prevents sifting, air deterioration and contamination from insects or dust. Newest development is to paraffin the printed side of wrap to give added protection to product. Wrap may be glued solidly to all six surfaces of the carton or "spot glued" at certain points.



7

7. TUCK TOP, SEAL BOTTOM. Has the advantage of a solidly sealed bottom and convenience of the easily opened and closed tuck top, for ready accessibility to contents. Best suited to automatic packing because of difficulty of sealing bottom by hand. Note essential similarity to No. 6 with the exception of the use of printing directly on the carton blank.



8-9

8. REVERSE TUCK CARTON. The most widely used of all carton styles for low-priced articles of all kinds. Easily set up by hand and adaptable to automatic packing. Convenient to open and close and exceedingly economical in manufacture because cartons interlock. This style not suited for heavy products, which must be held securely in the carton and require some positive means of locking the end tucks, or for powdery products, such as flour, salt and sugar, which are likely to sift through and thus require a seal end carton. Ready accessibility and low cost make this style carton ideal for five- and ten-cent units of candy, such as cough drops, as well as shaving creams and tooth paste in tubes. Type illustrated has special locking side flaps. See description No. 9 below.

9. REVERSE TUCK CARTON WITH ARTHUR LOCKS. Side flaps, top and bottom, or just the bottom, lock to prevent heavy contents from breaking through. Used principally for packing jars and bottles containing toilet preparations, medicines and condiments, which must be held securely in the carton.



10

10. STRAIGHT TUCK CARTON. This carton has no advantage over reverse tuck carton, but is required and extensively used with high-speed automatic cartoning machines. Must be made with right and left glue seams to secure economy of interlocking for economical manufacturing. Serves as an effective and satisfactory low-price package for the same large variety of products using the regular reverse tuck carton. When used for products packaged in glass bottles, it is advisable to equip the bottom flaps with a positive locking device to insure against the possibility of the bottle falling out of the carton. Inserts or corrugated liner may be used for added protection of the product.

SET UP
•
FOLDING
•
CIGAR BOXES
•
TRANSPARENT CONTAINERS
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LEBANON

New York Office, 51 Madison Ave.

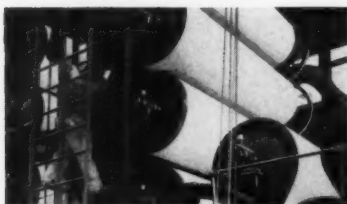
PENNSYLVANIA

New York Warehouse, Jersey City, N. J.





THERE'S A PREMIUM ON EVERY TICK OF THE CLOCK, today, as production managers work against time to get the job done, packaged, shipped. Lines must be kept moving. Hands must be kept busy. Wasted time, labor, material, packages must be kept to a minimum. That's why you'll find Gardner-Richardson Precision-Engineered cartons in many of America's largest and busiest plants.



PRECISION-ENGINEERED FOLDING CARTONS

fly through high-speed filling and sealing machines with fewer jam-ups, fewer leakers, less waste. Production men know this. They also know that they'll get this same split-hair, keep-'em-rolling accuracy in every order . . . order after order. For Gardner-Richardson Precision-Engineering starts with the pulp . . . stops only with the finished carton.



THEY ONLY TAKE "KNOW" FOR AN ANSWER.

Technicians and chemists in Gardner-Richardson plants are constantly testing, checking, proving . . . to make sure "Precision-Engineering" standards are rigidly enforced. Caliper and weight of boxboard are checked for uniformity . . . surfaces for printability. Cutting and creasing dies must pass exacting tolerance tests.

AT YOUR SERVICE. Gardner-Richardson's resources—in men and equipment—are available to carton users. Gardner-Richardson chemists and technicians, boxboard and printing experts, carton designers and stylists, are ready to give their interested attention to any carton problem which you may present—whether it is a basic problem of meeting wartime conditions, or the simpler problem of better display. Write. Or ask a Gardner-Richardson representative to call and talk it over.

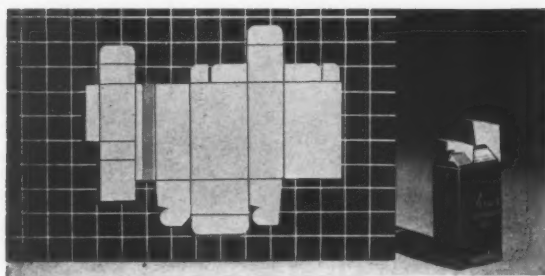
A DEPENDABLE SOURCE OF SUPPLY. Two great plants . . . and one rigid standard of Engineered-Precision . . . have built for Gardner-Richardson a reputation, not only for finer, more accurate, more eye-appealing cartons, but also as a dependable source of supply. That has always been important. But, today, it's more vital than ever. And it's evidently something that many of America's largest users of folding cartons appreciate.

The GARDNER-RICHARDSON Co.

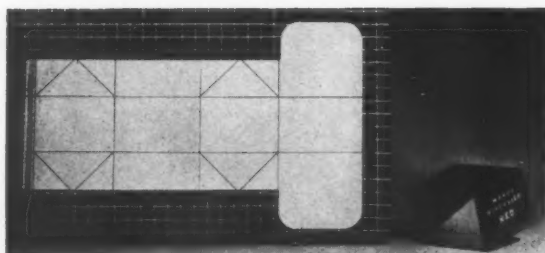
Manufacturers of Folding Cartons and Boxboard • MIDDLETOWN, OHIO

Sales Representatives in Principal Cities: Philadelphia • Cleveland • Chicago • St. Louis • New York • Boston • Pittsburgh • Detroit

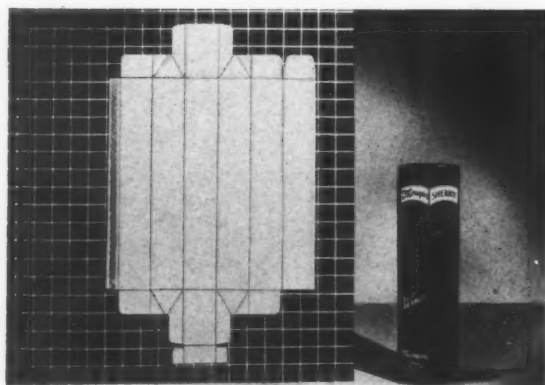




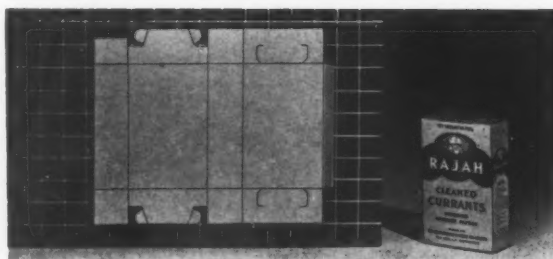
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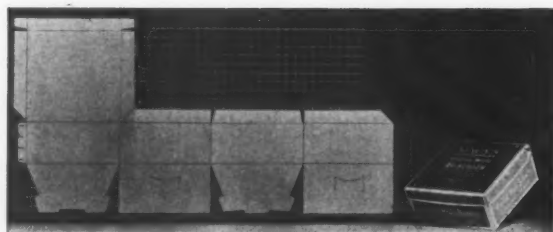
12



13



14



15

11. STRAIGHT TUCK CARTON, "2 in 1" STYLE. Patented carton made with an inside divider which, when folded into position, forms two separate compartments. Made in one piece, delivered in conventional knocked-down form. An ideal carton for a combination sale, such as a shampoo and a hair tint, or a bottle with medicine dropper or dispensing unit.

12. BELLOWS END CARTON. Web end construction forms a strong and tight end closure by hand assembly. Carton may be opened and tightly re-closed at will. Note simplicity of construction. Web end construction provides substantial protection against sifting when granular or crumbling products are packed in this type of carton.

13. HEXAGONAL CARTON: TUCK TOP AND LOCK BOTTOM. A patented carton that combines novelty with ease and speed of setting up. Quick-closing top requires only a single tuck or flap, while the Hibson lock bottom insures a permanent seal. Capable of holding the weight of a comparatively heavy inner package, such as a bottle of wine, liqueur or any other product packed in glass. Types of this sort are extensively used for display purposes and for seasonal promotion of products ordinarily merchandised in their glass containers alone.

14. GREENLEAF LOCK CARTON. Locks at each end securely. Widely used for packing dried fruits and other heavy bulky products. Also serves as a packer or carrier unit for a number of individual cartons. Locks of this type provide sufficient strength to support a comparatively great inner package weight, yet are so constructed as to permit of fairly frequent opening and re-closing by the consumer.

15. QUIKLOC STYLE CRACKER CADDY. Originally a caddy was a container for bulk goods which were dispensed in small units. Illustration shows one holding several pounds of crackers which is bought by many consumers. One-piece collapsible construction with patented bottom which is quickly set up. Two corners of cover require metal stitching by user. Note how the construction of the bottom flaps provides a multi-layer bottom when the caddy is erected.



security comes in boxes, too

➡ Product protection is our business. To provide safe passage for your merchandise to the consumer, Morris craftsmen are constantly creating, designing and manufacturing all types of paper packages—folding boxes, cartons and cans—the assurance of product security. This helpful service is always available to you in developing ideas to meet your packaging and merchandising requirements.

Write for details today

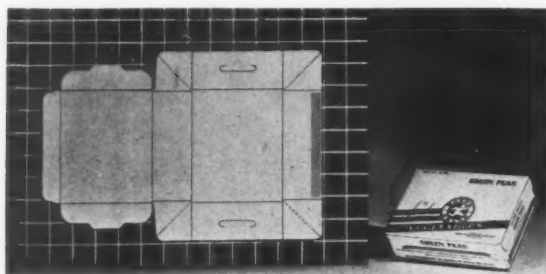
Creators of
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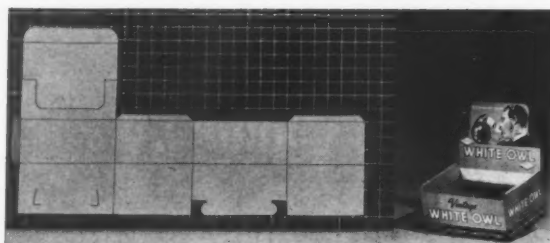
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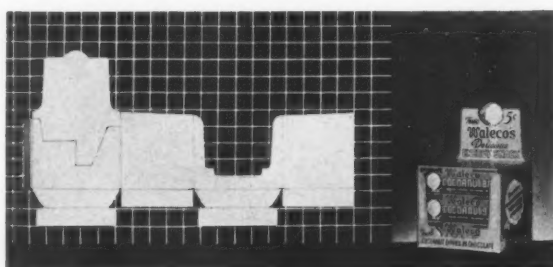
Morris
 FOLDING BOXES
 AND CARTONS



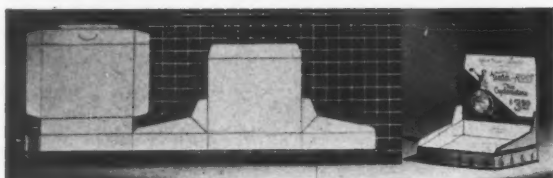
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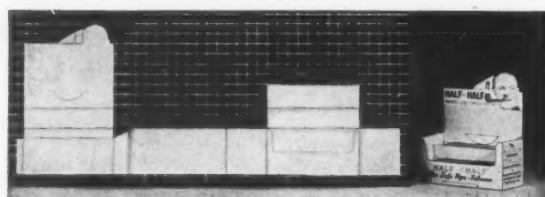
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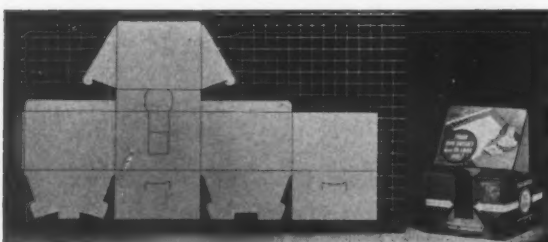
18



19



20



21

16. ONE-PIECE WEB ENDS AND SNAP LOCKS. This carton, delivered in glue tube fashion, is easily and quickly assembled. The carton shown was primarily developed for frosted foods, which require tight end closures and ease and speed in packing. It is well suited for various other types of products which require features mentioned above plus economy. Patented.

17. PANEL FOLD DISPLAY CONTAINER WITH LOCK BOTTOM. Simple in construction and setting up. Cover is so arranged as to make an attractive display panel. Protective cover is optional. Stands flat on the counter and provides good visibility to the displayed items. Requires printing and coating on only one side of the board.

18. BROOKS TWIN DISPLAY CONTAINER. This container is a lock bottom low front, with a pivoting swing display card. The display card is designed to give the effect of printing on two sides. This effect is gained by twisting the card 180 deg. when display is set up.

19. BROOKS TILTING DISPLAY CONTAINER. This style is equipped with a rear tab which the dealer elevates and secures in the rear panel, effectively displaying the merchandise at a desirable angle. This tab may be seen as indicated in the diagram-photo, upper left hand corner. This is a patented display container type of construction.

20. TWO-STEP DISPLAY CONTAINER. Patented display which shows products in two steps or tiers. Made in one piece, shipped flat. Easily set up by pushing down on two upright pieces which are scored to form the steps. Requires protective sleeve for shipping filled with merchandise. A simple, attractive display unit of sturdy construction and good counter stability.

21. COUNTER DISPLAY DISPENSER. A novel container in which the display panel, customarily placed at the back, is placed somewhat forward, so that only a few of the articles are displayed, the greater number being behind the display panel, from which position they are dispensed. Avoids disorderly appearance of partly filled displays after a few units are sold. This device is unsuitable where mass display is the desired merchandising method.

This Carton **BUILT A TANK!**



Of course we don't mean that literally, but the tin formerly used in aspirin boxes has now been made available for the construction of tanks, planes and guns.

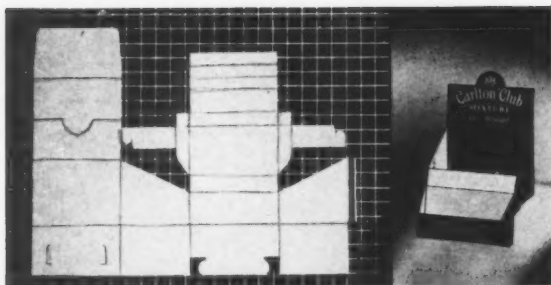
The aspirin box presented a double problem: First—converting from tin to boxboard, Second—producing a package in board as small as the original tin but still easy and economical to fill. This carton not only saves tin but also saves you money.

Perhaps you, too, have a problem of substitution. If so, send it to us. Very possibly we can submit an economical and practical solution.

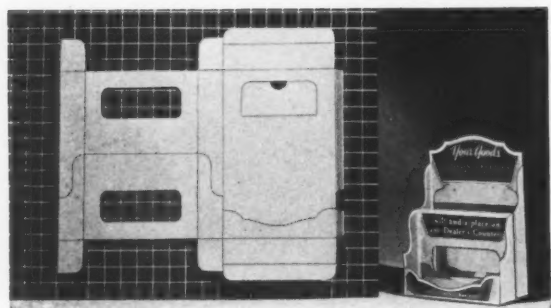


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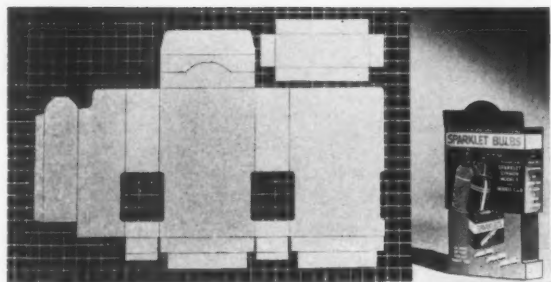
4501 WEST MITCHELL AVENUE · CINCINNATI · OHIO



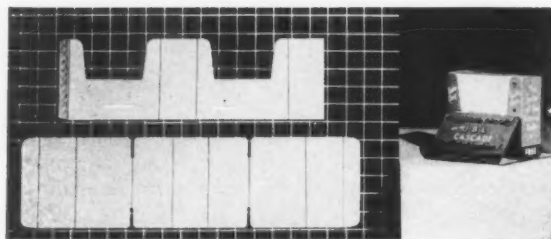
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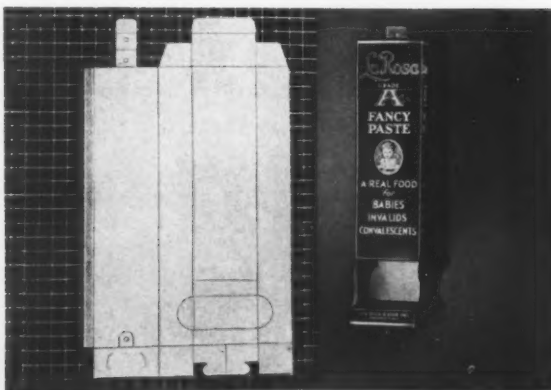
23



24



25



26

22. FRONT PANEL, LOCK BOTTOM DISPLAY CONTAINER WITH POCKET. An ingenious display by which contents are sold from the stock packed in the main portion of the container, while the pocket front permits an effective continuous display of the actual article. Prevents unsightly gaps in the display line, which is a weakness in many display containers. Note how the pocket front hangs below counter level or level of step on which main portion of display rests.

23. SKYSCRAPER (BROKEN BACK) DISPLAY CONTAINER. Patented container for displaying products in two tiers in an upright or "skyscraper" manner. Made with easel to hold second tier in raised position. Scored in center so that for shipping it folds up, but is readily set up for display by the dealer. When folded for shipping, the two halves of the unit so interlock as to form one flat, rectangular carton with all merchandise protected on all sides.

24. CENTER-DIVIDER DISPLAY DISPENSER. A straight tuck end carton with center divider forming two compartments. Readily filled, products falling into position with removal of bottom one. Stands erect on counter or may be hung on wall. Center divider construction a patented feature. Important considerations in planning dispensers of this type are: (a) provision of ample opening for withdrawal and (b) provision against "jamming" of product in reservoir tower. Both are easily provided for with a bit of foresight.

25. FREE PAMPHLET DISPENSER. This construction is easily set up on the dealer's counter ready to serve as a dispenser of pamphlets, advertising media or similar material. Its two-piece construction, simple and unique, is extremely inexpensive, and provides an economical means of shipping and distributing free literature. Note that the unit faces both ways—permitting use on island counters.

26. HANGER DISPENSER. This high, narrow dispenser holds a single row of packages, piled one on top of another, with an opening at the bottom through which they are easily withdrawn. Occupies minimum space on crowded drug store counters or may be hung on the wall or other available space. Note top and bottom hanger tabs, provided as an integral portion of the display carton blank.

For CHRISTMAS...the AMERICAN WAY!

...these Holiday Gift Cartons by "U-S"



NOTHING but the finest will do for The American Tobacco Company. So it was a logical choice for The American Tobacco Company to entrust "U-S" with the production of many of their 1942 Holiday Gift Cartons. The results speak for themselves, not only in the fine appearance of the cartons, but also in the large volume of holiday business done on these famous products. Do you have a carton problem? Our experience and facilities are at your service. Call in your "U-S" man.

THE UNITED STATES PRINTING & LITHOGRAPH COMPANY and DIVISIONS
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5 Great "U-S" Plants STRATEGICALLY LOCATED

PRODUCING PACKAGING AND LITHOGRAPHED ADVERTISING OF HIGHEST QUALITY



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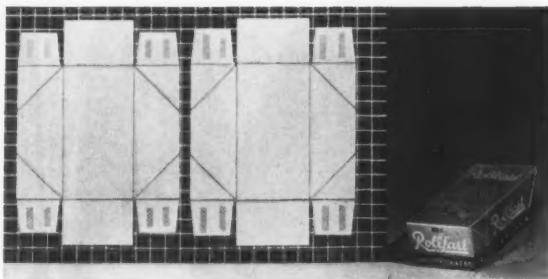


ERIE, PA.



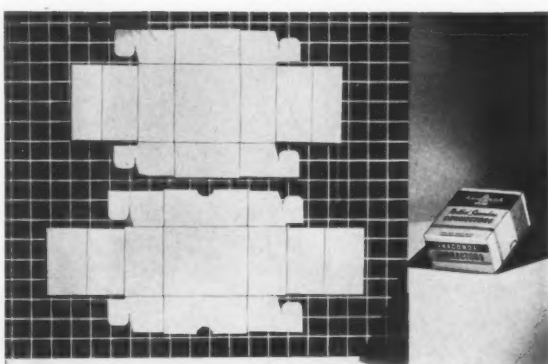
ST. CHARLES, ILL.

CLASS B



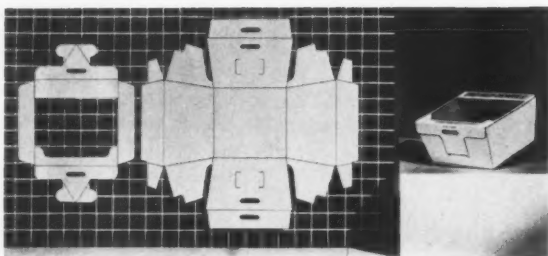
27

27. TWO-PIECE FULL TELESCOPE CARTON. These cartons are glued in collapsible form by carton manufacturer and shipped to user in that manner. Quickly set up by infolding to an upright position. Note that top half of container is slightly larger in all dimensions than lower or bottom half. This permits of telescoping without distortion of the container. Size, in such instances, must be accurately controlled to provide a right—but not too tight—fit.



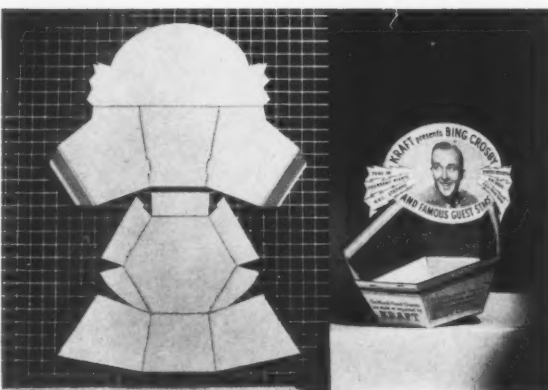
28

28. TWO-PIECE TELESCOPE CARTON WITH OVERLAPPING ENDS. This style carton assembled and folded by hand. Ends overlap and are held against the side by friction, but may be glued for additional reinforcement. A development of the overlapping end carton is an extra length tab provided as an additional protection on the top and bottom. A similar reinforcement along the sides can be provided for strength.



29

29. BERRY AND VEGETABLE CARTON. This type of carton has proven its adaptability to replace the ordinary wooden basket used for berries, small fruits and vegetables. Overlapping sides are wire stitched to set in proper position for use. Raised bottom and slotted sides insure proper ventilation for contents. Can be equipped with transparent window cover with locks to hold it secure. Patented.



30

30. BASKET DISPLAY CONTAINER. The display panel has been creased so that it can be folded to fit a shipping case. This does not interfere with the rigidity of the panel when on display as the panel is forced into a curved position.

Today

Michigan Cartons are fulfilling some mighty important war jobs. On Allied fronts, at training centers, and in the soldier's pack, they're busy safeguarding food stuffs. On the home front, too, for essential civilian products Michigan Cartons continue to give all the extras in sales-appeal and protection.

Tomorrow

Packaging news of the year is the outstanding job that folding cartons are performing on all fronts—as replacement packages—as space and weight savers—as versatile war packages. Revolutionary developments in coatings and laminations, new constructions and packing techniques, all point to the fact that cartons will assume an even greater role in post-war selling.

Although we're mighty busy now, we haven't for a minute lost sight of the fact that post-war markets will be tough . . . will demand keener merchandising and a better job of packaging. So, through continual research today we are preparing for a new era tomorrow. And when it arrives, you will find us ready to offer you finer cartons—cartons that will be even more economical, offer greater protection and beauty.

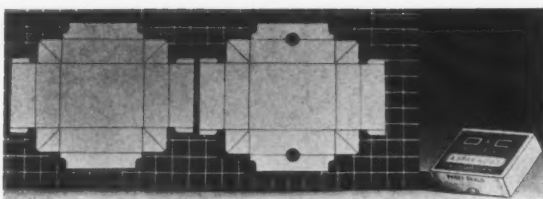
BOXBOARD • FOLDING CARTONS & DISPLAYS
MICHIGAN CARTON CO.
 BATTLE CREEK, MICHIGAN



FOR BETTER
 POST-WAR
 PACKAGES

Specify

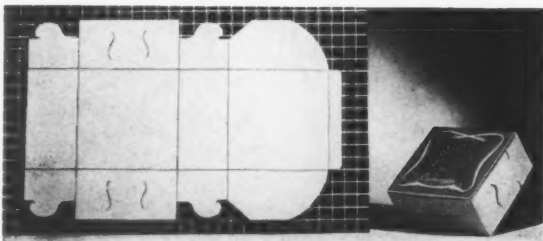
MICHIGAN CARTONS



31

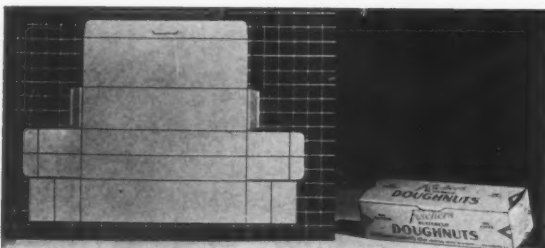
31. TWO-PIECE SIMPLEX STYLE CARTON. A carton construction which is rigid, easily set up and free of locks or tabs on exterior surfaces. The web corner construction prevents leakage when packing frosted foods. This style is also adaptable for shoes, textiles and other types of products requiring a two-piece carton. This is a patented type.

CLASS C



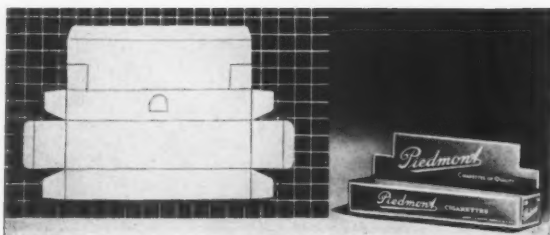
32

32. ONE-PIECE CARTON WITH FOUR HOOK CATCHES. Economical for use in local bakeries where small quantities of several sizes are required. Two catches on each end hold the carton upright. This style is not sufficiently durable to stand long distance transportation or rough handling, but is used by bakeries for packaging cake sold in their own retail stores and carried home by consumers. Also used on routes for delivery-trucks-to-consumer purchases in which case it is frequently made with a window of transparent cellulose.



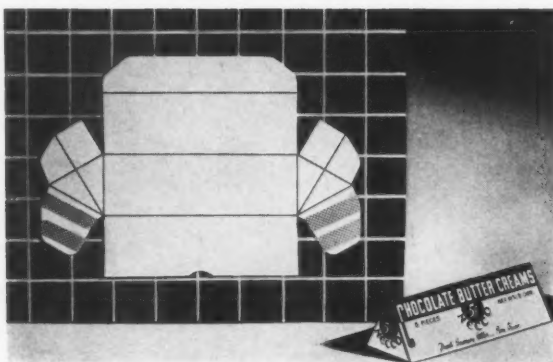
33

33. ONE-PIECE COLLAPSIBLE CARTON. A simple one-piece container serving as a carrier especially useful for bakery goods, cigarettes and many other products where quick set-up and low cost are factors. Shipped to user in knocked-down form, so that it occupies a minimum of storage space. Note cross hatched indications for glued seams. These tabs adhere to the outer ends of the bottom-most tabs. The intervening wall forming the bottom of the container is scored to fold in half, lengthwise, when shipped. This is snapped into erect position and made rigid by turning up tabs on side walls.



34

34. ONE-PIECE BRIGHTWOOD STYLE CARTON. A widely used one-piece carton for large scale production. Automatically formed, glued along the vertical panels, filled and sealed by Brightwood machines in the package user's plant. Definite economies in packaging can be effected by the use of this style carton if sufficient production is regularly handled to justify the use of this automatic equipment.



35

35. TRIANGULAR CARTON. This carton is received in a glued knock-down form. It is easily assembled for filling by pushing the ends inwardly. After filling, the carton is closed by tucking in the top panel. Its novel shape adds display value to the individual carton. Note score lines on side walls. The folding of these walls permits shipment of the pre-glued carton in the flat.

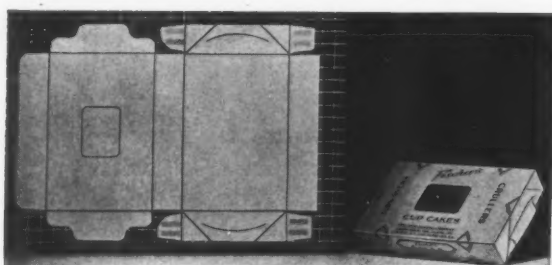
**NATIONAL SAVES CRITICAL
MATERIALS FOR THE WAR EFFORT**



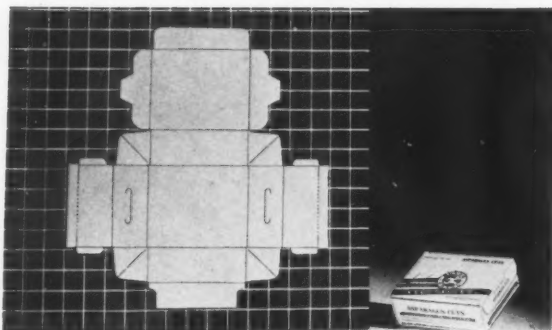
NATIONAL FOLDING BOX COMPANY

MILLS AND EXECUTIVE OFFICES — NEW HAVEN, CONN.

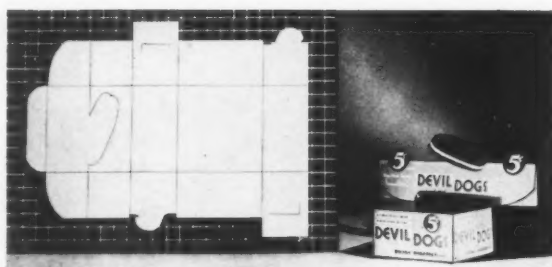
BOSTON — 143 Newbury St. • NEW YORK — 943 Chrysler Bldg. • PHILADELPHIA — 1201 Chestnut St.



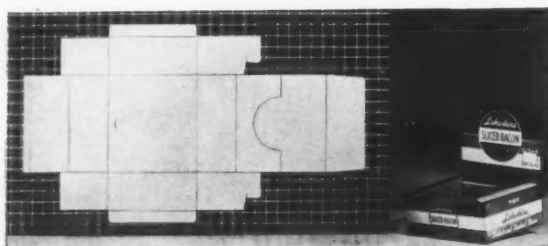
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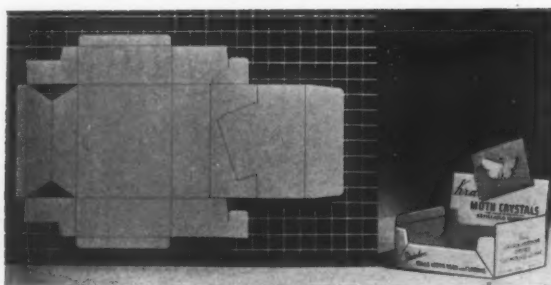
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39



40

36. ONE-PIECE COLLAPSIBLE CARTON. Quickly set-up carton, made with tongues on cover which tuck into slots on the sides, making this style especially well suited for baked goods and similar products. Transparent cellulose window allows view of product without opening carton, which is most important to keep food products fresh and avoid spoilage from exposure to dust, dirt, flies or frequent handling before sale. Sometimes used with an inner band or liner, placed around a cake, the carton being made sufficiently high to prevent contact of cover with frosting.

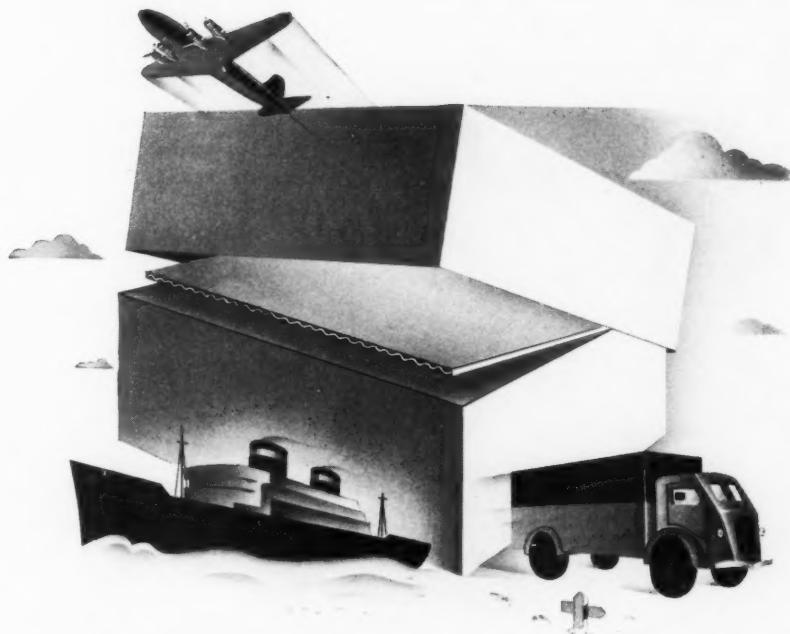
37. ONE-PIECE SIMPLEX STYLE CARTON. Combines rigidity, finish and strength of set-up box and economy in cost, shipping and storage of a carton. Quickly set up without machinery. Made in all sizes from small candy boxes to large containers for blankets. One-side printing. Made with or without display lids and slip-over covers. No raw cut edges or outside locks mar the outside printed surfaces or finished appearance of the carton. Patented.

38. ONE-PIECE CARTON WITH TWO HOOK CATCHES. An economical carton for local bakery use, where small quantities of several sizes are required. A catch lock on each end holds the carton upright. This style is not sufficiently durable to stand long distance transportation or rough handling, but is used by bakeries for packaging cakes sold in their own retail stores and carried home by consumers. Also used on routes for delivery-truck-to-consumer purchases, in which case it is made with a window of transparent cellulose.

39. ONE-PIECE OVERLAPPING FRONT—LOCK BACK PANEL, FOLD COVER. Economical to manufacture and extensively used for display purposes, this box has the added strength of the overlapping front which is not provided in the straight front box. The box can be made with panel-fold style display top, making possible the economy of printing on only one side of the sheet.

40. ONE-PIECE OVERLAPPING LOW FRONT DISPLAY CONTAINER. Similar to No. 39 except front is cut down to show face panel of articles when they are packed in an upright position. The tuck flap at the top of the container should be made long enough to provide full protection for the packaged contents at the front corner, where the low wall of the display container offers a relatively weak point.

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Or because it can take the place of scarcer plastic packages ...
but because ... well, let's get down to business ...**

The set-up paper box is made of materials that are readily available. In addition, it can save you shipping costs by reducing shipping weights . . . can save you packaging costs by reducing packaging time . . . can save you loss from spoilage, breakage and waste by its protective, rigid construction.

And are you looking for a package that will *sell* for you at the Point of Sale? Set-up paper boxes offer limitless opportunity for attractive design . . .

WALTER P. MILLER COMPANY, inc. *Paper Boxes*

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ARROW ANSWERS MATERIALS SHORTAGE WITH NEW IDEAS

Wood, Glass, Cardboard Show Uncommon Versatility in Arrow Wartime Creations

HOBOKEN, N. J., Nov. 7 — Arrow Manufacturing Company, makers of boxes and displays for commercial and industrial users, finds that new treatments of available materials solves the problem of scarcity in this field. Experience of the Company has shown that wartime limitations do not restrict creative effort but serve instead as a starting point for new ideas. Arrow regards as the possibilities.



NEW RECRUITS FOR ADVANCING LINES!

Available materials used excitingly! New materials fresh from the test tubes! And creative skills that know no limitations! These are Arrow's answers to today's boxing problems. Arrow wartime boxes and displays are constructed of wood and cardboard, with glass, plastic, mirror, and other trim. And they're geared for strong counter-action!

KNOCK ON WOOD!

"Jewel Tree" Set (1); "Guard of Honor" Set (2); "Sabots" Set (3); "Garden Cart" Set (4)—These Coty gift items, designed by Arthur R. Botham, illustrate the arresting presentations that can be created by ingenious use of wood. Ring Box (5)—Strikingly combines

wood with two fabrics of contrasting texture.

CASES IN CARDBOARD!

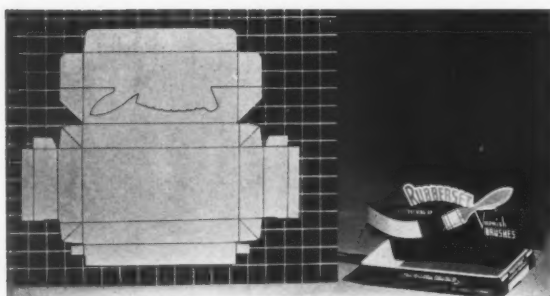
Compact (6); Nail Polish Kit (7); Watch Box (8)—Long-lived, appealing gift boxes with sturdy cardboard foundations. Leatherette, fabric, and other attractive coverings.

Arrow

BOXES AND DISPLAYS

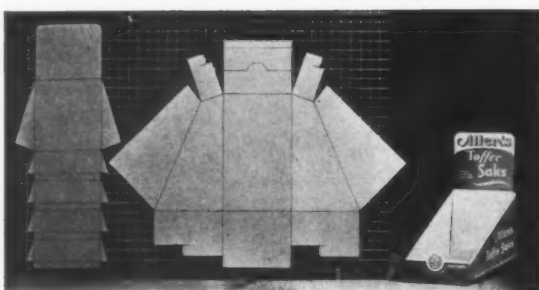
ARROW MANUFACTURING COMPANY
INCORPORATED

15TH AND HUDSON STREETS • HOBOKEN, NEW JERSEY



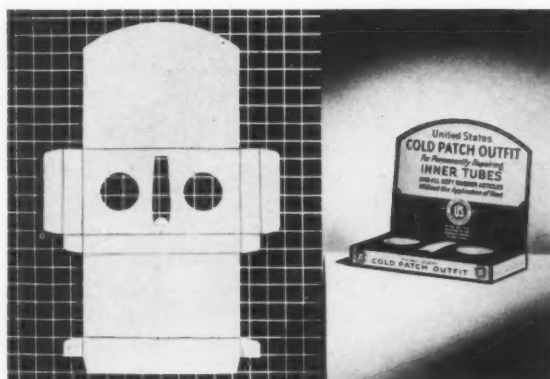
41

41. ONE-PIECE SIMPLEX CARTON DISPLAY. An efficient container and display unit. Die-cut cover offers excellent advertising display. Easily set up and free of locks on the exterior surfaces. Its most popular use is for one-dozen units such as paper wrapped toilet soaps, automotive or hardware items. Does not require protective sleeve as cover closes with front and side tucks. The side tucks, furthermore, increase the size of the display panel itself.



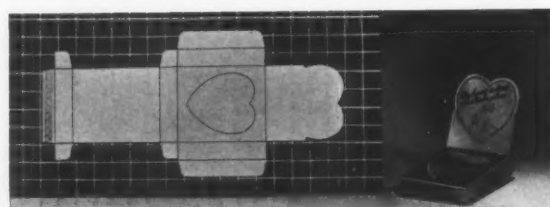
42

42. RHOMBOID DISPLAY CONTAINER. An effective new type of display container in which the individual packages are displayed in a staggered manner. Particularly useful for fragile items packed in glassine or transparent cellulose bags. Keeps packages in neat position while on display. This is a patented type of display container construction.



43

43. FIVE-PANEL COUNTER DISPLAY CONTAINER. This style has replaced the old type of five-panel carton which requires printing two sides and coating two sides, primarily used for introduction and sampling of new products. To set up this display, it is only necessary to insert the end tucks. Note that the four lower panels (in diagram) form a carton in themselves, the fifth panel, or tail, forming the display background.



44

44. FIVE-PANEL COUNTER DISPLAY. Same general style as No. 43 except that it has been made to serve as a display shipper and carry-home unit. As a carry-unit the display panel folds down over the die-cut carton face to provide an effective closure. If desired, this panel could be so designed as to incorporate locking tabs for added strength.



EFFORT

No—this is not a new flag design but a tribute to the American people's untiring effort. 'E' for Effort goes to the entire country and we hope, that soon the 'E' will become a 'V' for Victory.

The Americans who died at Pearl Harbor, at Wake Island, in the Coral Sea, on Guadalcanal, in North Africa, and those who will give their lives on the military and industrial fronts of this war, are sacrificing not for glory or fame but for the things which we all hold dear.

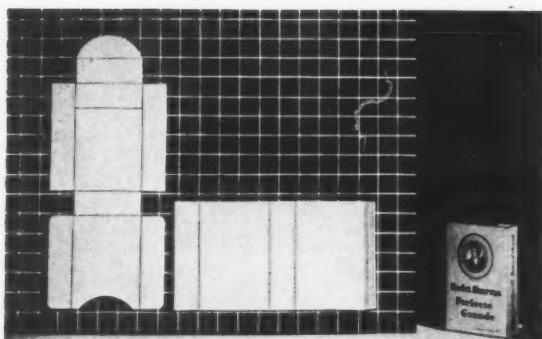
Like many concerns, Shoup-Owens effort is all out for victory. Like many peacetime products, the fibre can and the set-up box are now in the thick of the fight on all fronts. Our finest contribution to the war effort will be to make more and better containers, and to that end, we pledge 'E' for Effort.

Effort Plus Will Win
SHOUP-OWENS, INC.

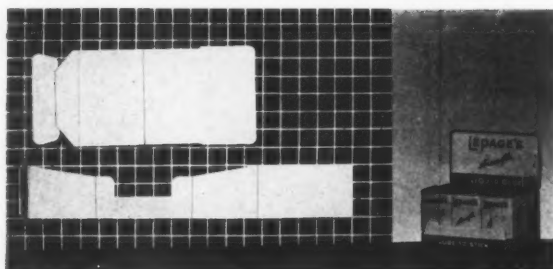
Manufacturers of Set-Up Boxes and Fibre Cans

HOBOKEN, NEW JERSEY

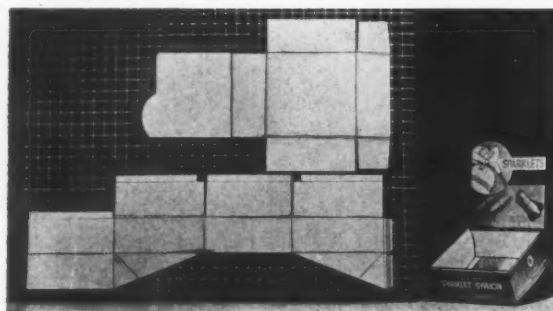
CLASS A B



45

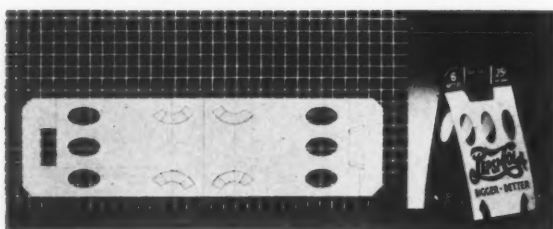


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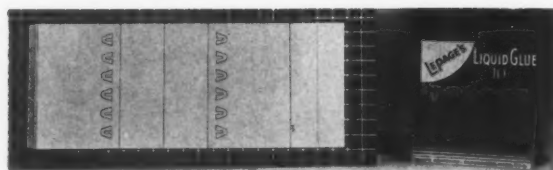


47

CARRIERS & DISPENSERS



48



49

45. **TUBE AND SLIDE.** Consists of a folding inner portion, variously contrived, to be inserted in a tube on which the design is printed. Access to the contents is easy and quick. It offers adequate protection for a wide variety of products, such as cigar packs holding five or ten popularly priced cigars. When this style is made with an inner tray it is well suited for pills and capsules which may be carried in the consumer's pocket.

46. **BROOKS TWIN DISPLAY CONTAINER.** A patented twin display container, the two sections nesting into each other, giving the dealer two distinctive counter displays. This unit of two containers requires a protective sleeve for shipping. It is economical and easy to set up by the packer and the retailer.

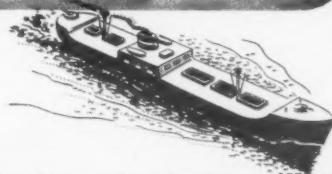
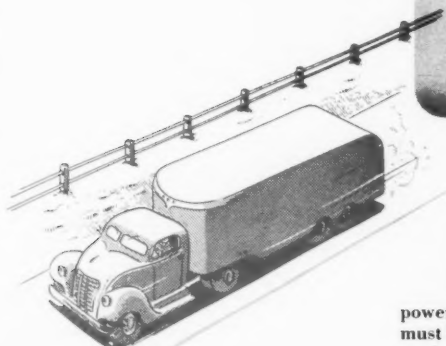
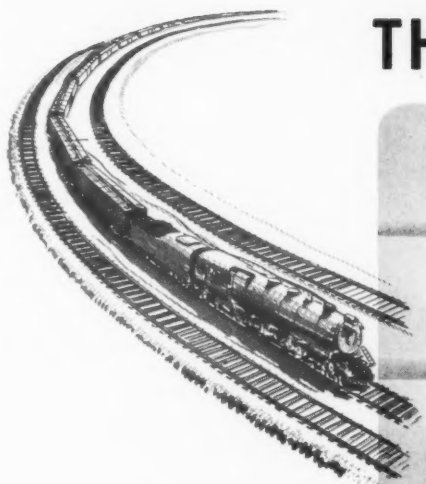
47. **SIMPLEX DISPLAY CONTAINER.** A special easel permits tilting this container at different angles, for effective display. Requires printing and coating one side only. Protective sleeve necessary for shipping. Principal feature is the simplicity with which the dealer may display the goods at an angle. Display panel is equipped with supporting flap which enables advantageous showing of the advertising message.

48. **THREE-BOTTLE CARRIER and DISPLAY.** This carrier has the feature of being an effective display and carry-home carton combined. It requires printing two sides; however, printing is only required on the inside for the display feature. For economy, therefore, the outside printing could be eliminated. Patent applied for.

49. **MULTIPLE UNIT DISPLAY CARD.** This economical display card holds twelve tubes suspended from die-cut tabs. Six units are on display with a reserve stock of six tubes on the back panel. The design repeats so that display can be reversed when front half of goods is sold. This card requires no separate easel but can be folded to ship flat.

PAPERBOARD

IS HELPING FIGHT THE BATTLE OF SUPPLY!



IN THE larger sense, freight-carrying ships, trucks and trains are but self-powered containers for whatever they are carrying. And within these larger containers must be hundreds and thousands of smaller containers protecting and keeping clean or dry or moist the goods of war and peace.

After Pearl Harbor, 1941, many of the materials from which these smaller containers were normally fabricated, marched straight off to war. This left paperboard with a Herculean packaging job to do.

And in the 12 months passed, paperboard has met the challenge!

From eggs for England to bomber parts for blasting Berlin, paperboard has proved itself in strength, protective qualities and economy. Here at Sutherland . . . where paperboard can be shaped into many sizes and forms, paraffined for safeguarding perishable foods, laminated for special protective qualities, printed for beauty . . . scores of new packages have been developed during the past year . . . and put into production to help solve the supply problem.

Let us show YOU what paperboard can do to solve your packaging problem now!



In "WARTIME PACKAGING", you may find the answer to YOUR packaging problem! Drop a line, right now, for your free copy of this helpful booklet.

SUTHERLAND PAPER COMPANY

KALAMAZOO, MICHIGAN

PACKAGING CATALOG

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Waxed Cartons in Wartime

by Owen E. Lyons

THE war has highlighted the value of cartons made of wax-coated or wax-saturated paperboard in providing resistance against loss of moisture from inside the carton, or penetration of moisture from the outside. Certain packaged food products such as ice cream, butter, lard, oleo, shortening, cheese, and frozen foods are shipped and stored under full or partial refrigeration. Upon removal from refrigerated temperatures to room temperatures, moisture droplets gather on the surfaces of the carton. Wax treatment provides resistance to this moisture and enables the carton to retain its strength and shape en route to the consumer's kitchen, or while stored in the consumer's refrigerator. The foods named above take by far the largest portion of the country's output of waxed cartons because of the need for a carton to resist the penetration of moisture from the surface.

Types of paraffin application

There are two principal methods of applying wax: the high-gloss or cold-water method, which leaves a coating of wax on the surfaces of the carton; and the saturation or impregnation method which drives the wax into the fibres of the board, leaving the surfaces comparatively dry and uncoated. A third and less common manner of treatment is "dull paraffin," by means of which a very light coating of non-glossy wax is laid on the surfaces.

The past year or so has seen a tremendous growth of a process once used only for peacetime protection of foods

into an integral part of the program of feeding and supplying the Army and Navy. This is the wax dipping system of protecting the outside of the package.

Some time ago firms wishing to guard the contents of frozen food packages from dehydration—at the same time doing away with the customary cellophane or paper liner—developed a method of dipping the folded and closed ends of the packages in a special wax bath. The only possible place where the carton would be subject to dehydration—the sides and body being made of waxed paper originally—was at the ends where the carton folds were made. The wax treatment completely covered the ends. Special waxes were used to provide a covering that would be fairly flexible and would not become brittle or flake off when it hardened or was subjected to temperature changes.

The large quantities of food and other supplies for the armed forces are now almost universally given the wax dip treatment. The difference is that these military packages are completely dipped, covering the entire surfaces with a heavy and protective wax coating. Packages so protected will stand up perfectly under widely differing temperatures and humidities. When food or other goods are packaged for military uses, there is no certainty as to where the package may eventually be shipped—to a far northern outpost or a tropical port. Nor is there any assurance what warehouse facilities, if any, will be available on arrival.

It is easy therefore to understand the many reports that whole shiploads of goods are safe even though piled up, out in the open, without any protection from heat, rain, cold or snow beyond that which the individual packaging affords to the contents. One story told of a base where a harbor was being built. It was necessary for ships to drop anchor some distance from shore and unload their cargoes into small boats. Some goods, even, were merely thrown overboard and allowed to float inshore with the tide. The wax dipping process makes all of this possible and guards millions of dollars worth of food and material from destruction.

Sequence of manufacturing operations

The basis of manufacturing paraffined cartons is the printing and die-cutting of the carton so that its printed design and all the board used in its construction are available in one unit, properly printed, scored and cut. Production of commercial quantities of cartons is handled in combination runs—same number of cartons per sheet. The combination may include cartons of but one design, or it may be made up of various sizes, colors, designs, and construction combined to run efficiently together. Manufacturing procedure follows this sequence: printing, die-cutting and scoring, paraffining and gluing.

Waxed cartons of this type give adequate protection for many types of foods. May be packed even at retail counters. Photo Menasha Products Co.



Saves Manpower... THE SET-UP PAPER BOX



Today, with virtually all man- and woman-power at a premium, many manufacturers are thanking the set-up paper box for big savings. Rigid, ready to use, it loads faster . . . saves many wasted motions and moments in the packing room. And its rigid construction, plus its protective covering papers, give added protec-

tion to vital products in transit . . . deliver them safely . . . conserve the manpower which went into their production!

Why not investigate *all* the advantages of today's most quickly available package? You are invited to reverse the 'phone charges to any Master Craftsman.

BALTIMORE, MD.
Maryland Paper Box Co.

BOSTON, MASS.
Bicknell & Fuller Paper Box Co.

BROOKLYN, N. Y.
Specialty Paper Box Co.
E. J. Trum Co., Inc.

BUFFALO, N. Y.
Thoma Paper Box Co.

CHATTANOOGA, TENN.
Atlas Paper Box Co.

CHICAGO, ILL.
Kroeck Paper Box Co.

COLUMBUS, OHIO
Columbus Paper Box Co.

DANVERS, MASS.
Friend Paper Box Co.

DETROIT, MICH.
Stecker Paper Box Co.

HARRISBURG, PA.
The McClintock Corp.

KANSAS CITY, MO.
Crook Paper Box Co.

LOUISVILLE, KY.
Finger Paper Box Co.
Kentucky Paper Box Co.

MERIDEN, CONN.
Shaw Paper Box Co.

NASHVILLE, TENN.
American Tri-State Paper Box Co.

NEWARK, N. J.
Mooney & Mooney
Newark Paper Box Co.

NEW YORK, N. Y.
A. Dorfman Co., Inc.

PAWTUCKET, R. I.
Shaw Paper Box Co.

PHILADELPHIA, PA.
Datz Mfg. Co.
Walter P. Miller Co., Inc.
Edwin J. Schoettle Co.
George H. Snyder, Inc.
Sprowles & Allen

PORTLAND, ME.
Casco Paper Box Co.

PROVIDENCE, R. I.
Hope Paper Box Co.
Taylor Paper Box Co.

SEATTLE, WASH.
Union Paper Box Mfg. Co.

SOMERVILLE, MASS.
Consolidated Paper Box Co.

ST. JOSEPH, MICH.
Williams Bros.

ST. LOUIS, MO.
Great Western Paper Box Co.
Moser Paper Box Co.
F. J. Schleicher Paper Box Co.
Service Paper Box Co.

UTICA, N. Y.
Utica Box Co., Inc.

WILMINGTON, DEL.
Wilmington Paper Box Co.

COOPERATING SUPPLIERS:

Appleton Coated Paper Company; Blackstone Glazed Paper Company; Bradner Smith & Co.; Louis Dejonge & Company; Globe Manufacturing Co.; Hampden Glazed Paper and Card Company; Hartford City Paper Co.; Hazen Paper Company; Holyoke Card and Paper Co.; Holyoke Coated & Printed Paper

Co.; Hughes and Hoffman; Lachman-Novasel Paper Company; Marvellum Company; Matthias Paper Corporation; Nashua Gummed and Coated Paper Company; Pejepsco Paper Co.; Plastic Coating Corp.; Racquette River Paper Company; Riegel Paper Corporation; Stokes and Smith Co.

Master Craftsman of the SET-UP PAPER BOX INDUSTRY
ROOM 1106, LIBERTY TRUST BUILDING, PHILADELPHIA, PA.

PACKAGING CATALOG

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Printing and waxing

The merchandising advantages of well-printed designs and colors are available to buyers of paraffined cartons. Paperboard manufacturers provide a well-bleached outer surface that is excellent for modern printing processes. A semi-bleached or unbleached inside surface is usually specified for cartons that carry food not directly in contact with the inner surface—butter and lard, for example. Linerless ice cream cartons are factory-filled, with the ice cream directly in contact with the inner surface. A solid-bleached sulphite board is standard for this carton, because of its cleaner, more sanitary appearance. A producer of frozen foods recently adopted a linerless carton for packaging vegetables, using a solid bleached sulphite board. On the subject of direct contact of foods with cartons, it should be mentioned that leading manufacturers of board have made notable contributions to sanitary packaging through microbiological studies of paperboard.

The inside surface of a linerless ice cream carton is treated with a special, high-gloss, hard-surface wax to insure against weakness of the surface next to the product. The outside surface is treated with a lighter, egg-shell wax coating which affords adequate protection against attack by moisture from the outside. Varying weights of wax, and varying compositions, may be applied to attain specific protective properties.

Considerable progress has also been made in paraffining. In addition to a store of technical knowledge concerning waxes, wax combinations and properties of waxes, the industry has greatly advanced the technique

of applying wax. Flexibility and accuracy of application has greatly improved.

Gluing of paraffined cartons

The gluing operation follows the printing, die-cutting and waxing of high-gloss waxed cartons. Special gluing machines remove the wax from the surfaces to be glued, a glue wheel spots the adhesive at the proper points, and the folding and setting of the glued surfaces is then done by the gluing machine. Glues derived from vegetable sources are standard specifications for food-containers.

The gluing of saturated or impregnated cartons also follows printing and cutting. Because of the comparatively dry surfaces of impregnated cartons, gluing is easily handled. Pail-shaped packages for ice cream are examples.

For extra charge (an extra machine operation), the paraffined cartons used for ice cream can be furnished with a de-waxed strip or spot upon which flavors may be stamped or written during packaging.

Construction and sizes

Paraffined cartons for foods in contrast to unparaffined cartons for miscellaneous uses, are well standardized in construction and in size. This is especially true of packages for ice cream, units of which have been standardized in pints, quarts and multiples thereof. Packaging of ice cream is either a semi-automatic or a manual operation, and this has a bearing on standardization of construction.

Likewise, cartons for butter, lard, oleo, shortening and cheese have a constant unit of sale—the pound or multiples of the pound—which limits their variation in size. Some leeway is required in the construction of cartons because of slight variations in the automatic machinery available for packing these products.

The newest branch of the food business to become a sizable purchaser of paraffined cartons is the frozen food industry. Marked differences in construction of cartons and in sizes have characterized its packaging during its expansion of the past decade and its standards are still being developed. This applies chiefly to consumer-size packages in which the unit of sale is an "average-family" serving. Since this varies in volume and size with the density or looseness of frozen vegetables and fruits, a variety in sizes seems to be unavoidable.

Because frozen foods require extraordinary protection against dehydration, a number of packages intended to assure that protection have been used by the industry. Many have proved unsatisfactory. As yet there is no general agreement on the best protective package for frozen food.

Through attempts at extraordinary merchandising effects, numerous "trick" packages have also been adopted and used for frozen foods. Despite these differences in construction and size, paraffined containers are universally specified by this new industry because of the protection they provide against condensed moisture when removed from refrigeration.

Paraffin-treated cartons for quick frozen foods. Photo Sutherland Paper Co.





One Shortage We Americans Will Never Know

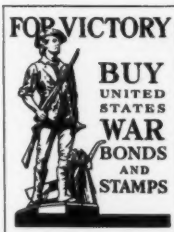
MATERIALS may be scarce and grow scarcer. The vital needs of our armed forces may be great and grow greater. But America will never run short of courage, ingenuity, resourcefulness—the ability to see the job through no matter how hard it is or how long it takes.

In packaging, this spirit finds expression in many ways. In placing production for war above all other considerations. In the development of new materials for civilian needs. In the design of packages

that require less of the materials now available.

Ritchie design and production experts are busy now seeking new ways to meet the packaging needs of present Ritchie customers. Would you like to share in the benefits of this work? We will gladly study your package to see if design changes or material substitution can insure you a steadier supply.

This service is offered to any established manufacturer without cost, without obligation and without thought of gaining immediate sales.



W. C. *Ritchie* AND COMPANY

8861 Baltimore Avenue, Chicago

SET-UP PAPER BOXES
FIBRE CANS
TRANSPARENT PACKAGES

NEW YORK

DETROIT

LOS ANGELES

ST. LOUIS

MINNEAPOLIS

DENVER

MIAMI

PACKAGING CATALOG

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Set-up Paper Covered Boxes

by William J. McClintock, Jr.

THE current trend, a wartime necessity, has changed the form of service being rendered by the set-up box manufacturer. Many types of decorative packaging have been abandoned for the duration. Limitation Order L-239, issued early in 1943, prescribed size specifications for retail set-up boxes and restricted the manufacture of boxes from virgin wood pulp. But this by no means precludes the use of set-up boxes because this form of package has few wider applications for utility other than obvious decorative advantages.

Any rigid paper box that is delivered in finished form is termed a *set-up paper box*. This type of box is delivered to the user ready for the inserting of merchandise without further processing. In contrast to the bending boxboard used for folding boxes, non-bending or rigid boxboard is used for the set-up type. Whereas the minimum thickness of boxboard for folding boxes is .016 in., the minimum for set-up boxes is .030 in. Set-up boxes can be handled and packed speedily and this combination of advantages is utilized in many packages of excellent protection and beautiful design for such merchandise as perfumes, cosmetics, lingerie, candy, stationery, hosiery, handkerchiefs, pharmaceuticals, etc.

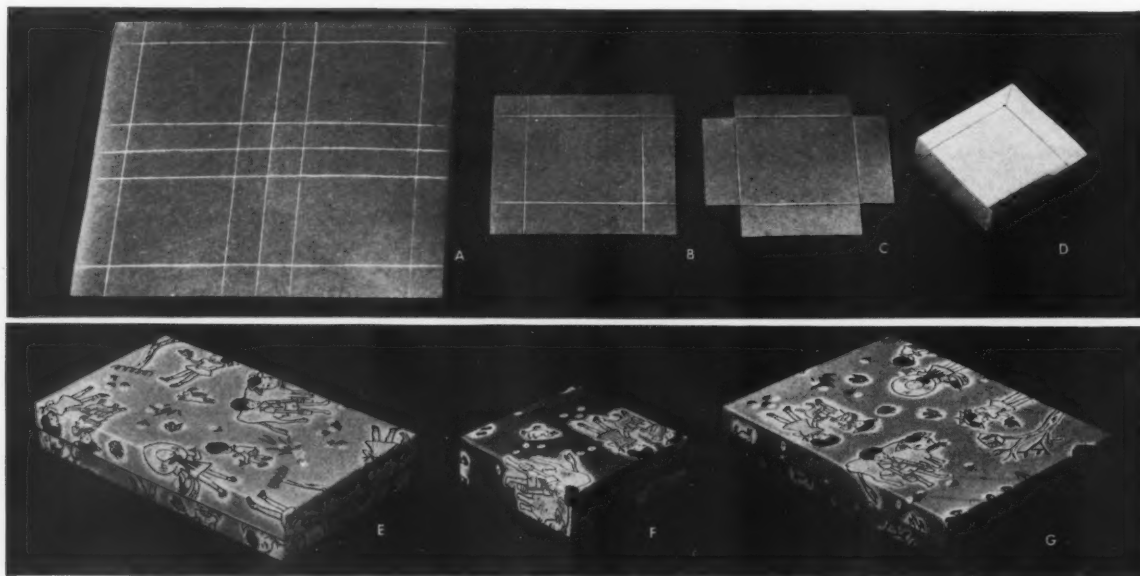
All measurements for paper boxes should be given or accepted in terms of inside measurement only (score measure). The measurements should be stated in the following order: length, width, depth; and when a fourth dimension is given it should indicate the depth

of the lid. For instance, $10 \times 5 \times 2\frac{1}{2}$ indicates a box 10 in. long, 5 in. wide, and $2\frac{1}{2}$ in. high, with a lid $\frac{7}{8}$ in. deep. For a box with a shoulder, measurements should indicate the inside measurement of the neck, followed by the depth of base and lid, for example: $10 \times 5 \times 2\frac{1}{2}$ neck, $1\frac{5}{8}$ base, $1\frac{1}{4}$ lid.

The application of fancy papers or specially designed wraps gives an appearance of permanence and beauty to set-up paper boxes, while the combination of rigid transparent covers and set-up bases produces a box with unusual display value. There is still a variety of beautiful papers available despite wartime restrictions. Produced economically in rolls, from which wraps can be cut, these papers offer splendid possibilities for diversification of color and decoration in this type of box without the necessity of purchasing extremely large quantities to absorb the cost of art work, engravings, etc. Where a fixed design is required, wraps may be printed, embossed, hot-stamped, die-stamped, engraved, lithographed, photo-offset—in fact, any decoration that can be applied to paper may be used on the wrap for a set-up box. Because of the rigidity of these boxes, many interesting decorations can be used with good effect and lasting beauty.

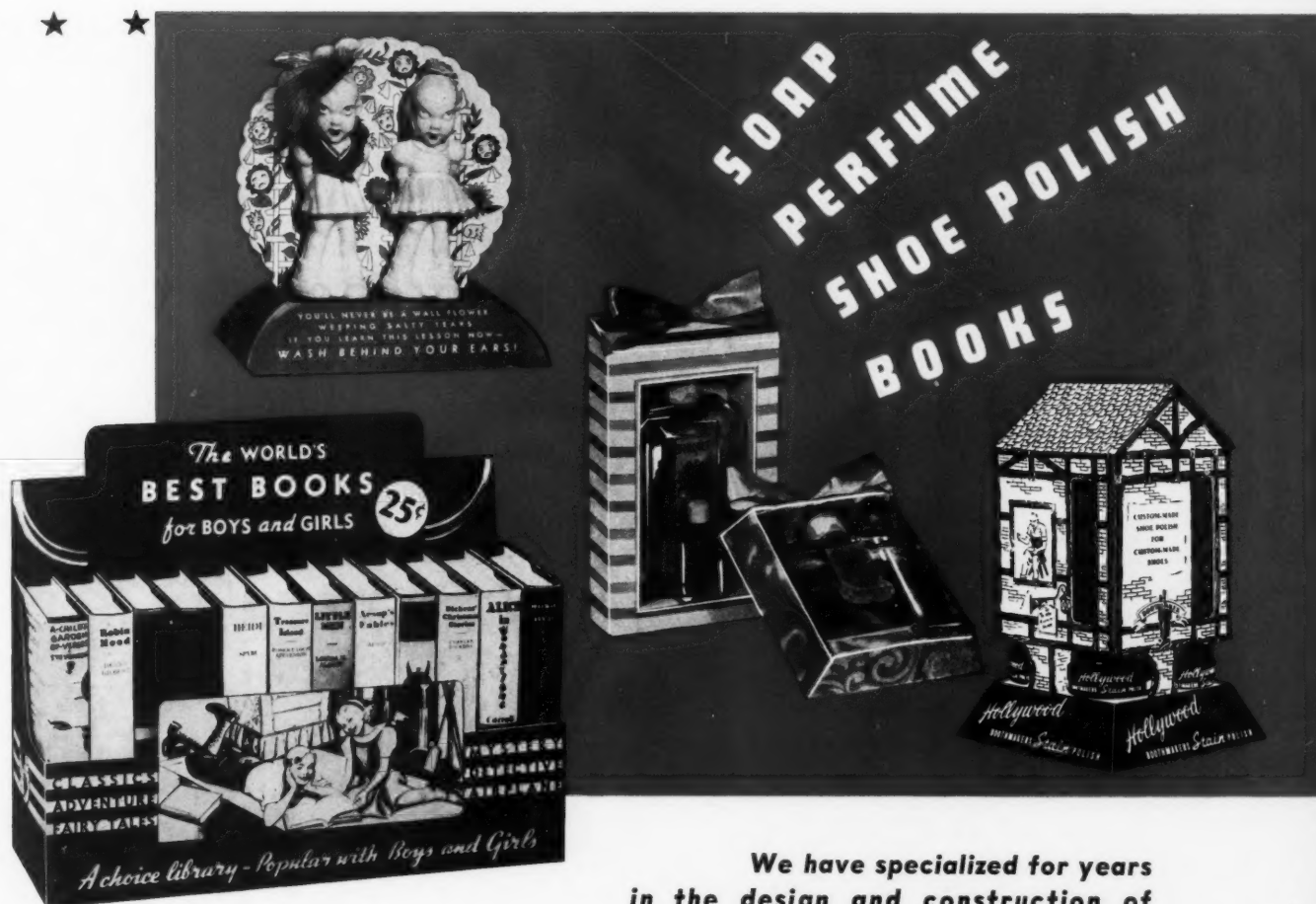
The terms used in the set-up paper box industry appear in the accompanying glossary which is followed by illustrations showing the basic styles and types of this form of package. Many adaptations of these styles are possible.

A. Sheet of boxboard is first scored to the size specified. B. The scored sheet is then broken into individual box blanks. C. These are corner cut. D. Next, they are turned down and corner stayed. The lid is processed similarly. E. Together they form the simplest type of set-up box known as a "skeleton" box with shallow lid. F. Next type is the full-telescope lid, made by increasing its depth to that of base. G. The shoulder style is made by adding an extra base or inserting board scored to form inner shoulder.



MERCHANDISING DISPLAYS *with* UNIQUE FOLDING CONSTRUCTION

★ ★ ★



(SEE REVERSE SIDE FOR WAR
FOLDING BOXES AND THEIR USES)

We have specialized for years in the design and construction of unique folding displays and merchandising packages. We mention this fact for what it can mean to you: that we have the fullest experience and facilities to design, print, die-cut, displays and containers that make good merchandise stand out. Brooks & Porter packages and displays build dealer good-will and win out in the toughest counter competition.

★ ★ ★ ★ ★ ★ ★

IF YOU HAVE GOODS TO SELL,
WE CAN HELP YOU SELL THEM!

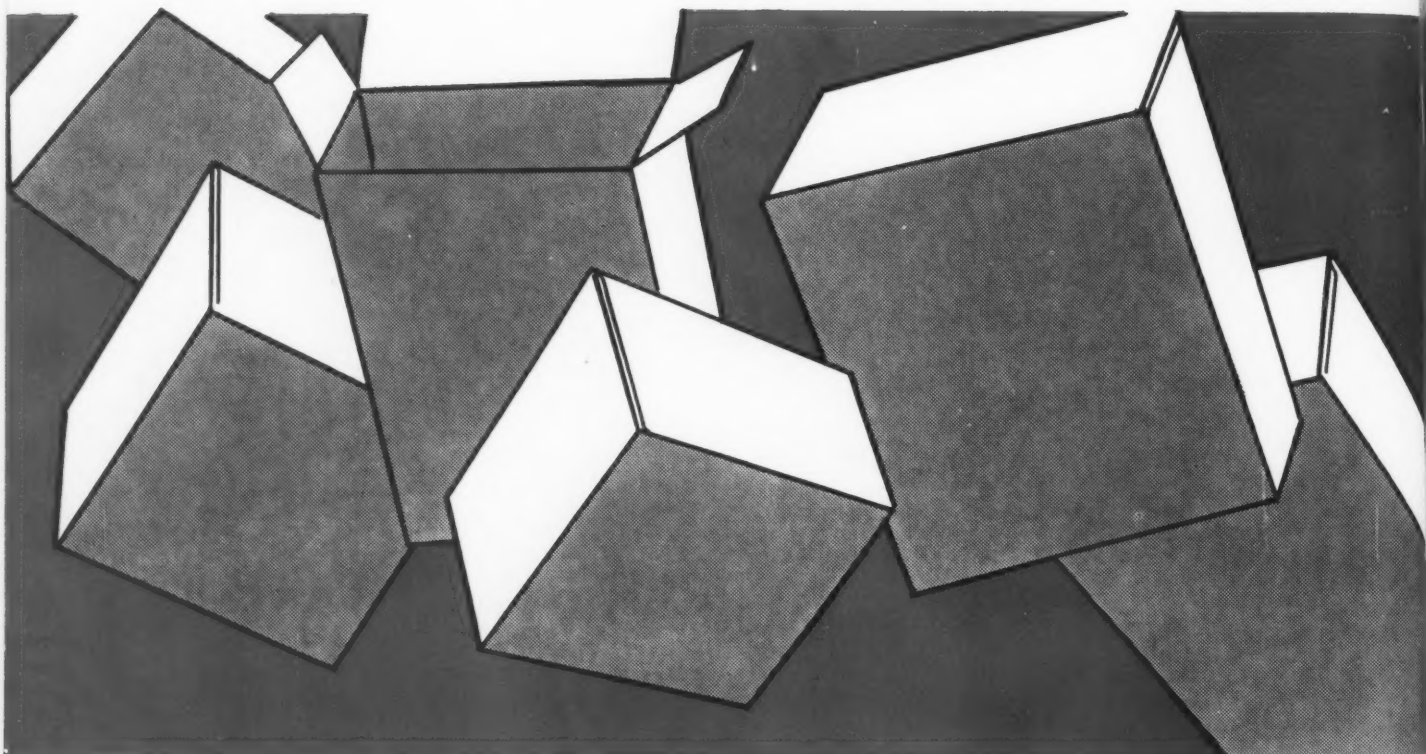
★ ★

BROOKS & PORTER, Inc.

304 HUDSON STREET . . . NEW YORK, N. Y.

FOLDING CARTONS FOR WAR NEEDS

★ ★ ★ ★ **FOR SUB-ASSEMBLIES, STORAGE, SHIPPING,
● FOR PROTECTION AND EASE IN HANDLING**



Strong folding boxes are used to protect sub-assemblies and delicate parts while being routed from one department to another. They are also used to protect goods in storage; and to make inventory control easier in hard-working war plants. On the fighting fronts, they bring food, ammunition

and other necessities directly to the soldier, sailor or marine who needs them in perfect condition. In all applications they save a good deal of space by folding flat when not in use. They are sturdy enough to be re-used several times.

THEY ARE INEXPENSIVE

★ ★

BROOKS & PORTER, Inc.

304 HUDSON STREET . . . NEW YORK, N. Y.

GLOSSARY OF TERMS

Name of Material Machine or Construction	Definition	Name of Process or Operation
ADHESIVE:	Any viscous substance used to attach one material to another. Those commonly used in the manufacture of paper boxes are animal glue, vegetable glue (hot or cold), gums, dextrins, and paste	
BALING PRESS	Machine for baling scrap	Baling
BAND	Strip of covering paper around sides and ends of box, without turn-in	Banding
BASE	Lower unit or receptacle of a paper box	
BENDING MACHINE	Machine used for bending sides of base, lid, or tray	Bending
BLANK	Any die-cut, scored and corner-cut, or otherwise partially prepared section of boxboard, in the flat, to be formed into a box or part thereof, e.g., base, lid, or tray.	
BOTTOM	Under surface of the base	Bottom setting
BOTTOM LABEL	Paper attached to bottom or under surface of base	Bottom papering
BOTTOM PAPER		
BOX	A complete paper box, including base and lid; also used for base alone (see above)	
BOXBOARD	Board used in the manufacture of paper boxes*	
COMPARTMENTS	Sub-divisions in a box formed by partitions	
	Placing lids on bases	Closing or lidding
CONTAINER	Large paper box used to hold definite number of smaller boxes	
CORNER	The line formed by junction of sides and ends of base, lid, tray	
CORNER-CUTTING MACHINE	For <i>Board</i> : Machine for removing corners from scored blanks and for cutting triangular piece from "ended" box blank, so that side and bottom flanges will bend without interference. Available in single, double, quadruple models For <i>Paper</i> : Machine for cutting corners from paper blanks used in loose and tight wrapping operations	Corner-cutting Mitering
COVER	Upper or closing unit of a paper box	
COVERING MACHINE	Machine used in covering, trimming, or bending boxes or parts thereof with paper from roll. Available in hand-operated and power-driven automatic models	Covering
CUTTER	Machine for cutting boxboard, paper, and other materials into sheets or strips of smaller dimensions	Cutting
CUTTING AND CREASING PRESS	Machine for cutting and creasing and die-cutting or scoring blanks in boxboard	Cutting and creasing Die-cutting
CUTTING RULE	Steel strips, ground to center or side face used for cutting through stock	
CUT-SCORING RULE	Steel strips ground to center or side face, used for partially cutting through stock, i.e., scoring form for purpose of forming a bending line	
CREASING RULE	Steel strips with oval face, used to form a crease or bend a line in stock	

* For descriptions of grades, see *Boxboards, Types and Selection*, p. 76.

Name of Material Machine or Construction	Definition	Name of Process or Operation
DIE-STAMPING PRESS	Machine used in reproducing design or lettering from engraved plates	Die stamping
DIVIDERS	Loose strips of paper or boxboard used to separate commodities placed side by side	
DOMING MACHINE	Upright press for embossing or doming by applying heat and pressure	
DROP-END	A box in which the end of the base is made in two parts, one hinged to the other, or in which end is hinged to bottom	
DROP-SIDE	A box with the side arranged as described above	
DRUM	Shell or tube with paper head, for powder box	
DUTCH TOP	Lid with padded top slightly smaller than lid in length and width; set-up with shell	
EASELS	Supports attached to box to hold it upright for display purposes	
EDGE	Line formed by junction of sides and ends to top or bottom of lid, base, or tray	Trimming or edging Trimming upper and lower edge of lid, base or tray
ENDING MACHINE	Machine for attaching ends to base or lid. Available in single or double model	Ending or end setting
ENDS	Pieces of boxboard attached to side and bottom flanges of ended box	Ending or end-setting
EXTENSION MACHINE	Machine for attaching piece of boxboard to top of lid or bottom of base, the piece of boxboard being greater in length and width than the lid or base	Extension edging
FLANGE	That part of a blank that is glued for attaching ends, or sides, or for joining the ends of shell blank. Also the walls of any corner box blank	
FLAP LID	Lid without sides or ends, hinged to base	
FLIES	Strips of plain, printed, or lace paper attached to inner edge of base to cover goods or for decorative purposes	Flying
FLYING MACHINE	Machine for cutting, gumming, and attaching flies	
INVERTED TRAYS	Trays, stayed, or unstayed, placed inside base, inverted	
FILLERS	Loose strips of boxboard, plain or scored, used to fill spaces not occupied by commodities	
FRAMES	Die-cut or mitered forms of boxboard so shaped as to form a display frame for the goods	
FRENCH LID	Lid with extension edge which has sides and ends less in depth than sides and ends of base, and which fits over outside of base	
GLUER	Machine for applying adhesive to surface of paper or boxboard	
HAND SHEARS	Hand-operated knife for cutting sheets of paper, cloth, lace, etc.	Hand work or table work
	Any process in the manufacture of a paper box performed without the aid of a machine	
HINGE	Strip of cloth or paper used to hold parts of box together	Hinging
LABEL	A plain or printed piece of paper attached to box or any part thereof; distinct from top or bottom paper	Labeling

Name of Material Machine or Construction	Definition	Name of Process or Operation
LACE	Paper decoration stamped or embossed to imitate lace or embroidery	
LAP	Portion of cover paper that overlaps where ends of paper are joined on base, lid, tray, shell	
LAYERS	Loose pieces of boxboard used to separate horizontal layers of contents	
LID	The upper or covering unit of a paper box	
LID SUPPORT	Tape or ribbon to hold hinged lid in position when box is open	
LIFTS	Pieces of ribbon, cloth, tape or paper attached to trays for convenience in removing from base	
LINING	Material used to finish or decorate interior of base or lid	
LINING MACHINE	Machine for attaching paper from the roll to surface of boxboard	Lining
LOOSE WRAP	Lid covered with paper, wrap folded and shaped on ends of box, either by machine or by hand; wrappers in one piece with adhesive only at edges	Loosewrapping
MACHINE FORMS	Forms of boxboard, wood, or metal used in conjunction with certain machines, e.g., covering machine forms, wrapping machine forms, quadruple staying machine forms, etc.	
MICROMETER	Instrument for measuring thickness of materials in thousandths of an inch	
NECK	A shell inserted in base, attached by adhesive, and extending above the base into the lid when box is closed (see <i>Shoulder</i>)	Necking or shouldering
NEST	Collection of boxes of various sizes, one within another*	
PACKER	Bundling and wrapping boxes in kraft paper for delivery	Package wrapping
PAD	Same as <i>Container</i>	
PAD	Card or layer covered with paper or cloth and having one or more layers of wadding or other padding	Padding
PADDED TOP	Extra top, covered with paper or cloth and having one or more layers of wadding or other padding; attached to top of lid	Padding
PAPERS	The following is a list of papers commonly used in the manufacture of set-up paper boxes: News, Book, Label, Manila, Kraft, Friction Glazed, Flint Glazed, Brush Finish, Embossed, Printed, Florals, and Fancy. For descriptions.	
PARTITIONS (loose)	Slotted pieces of boxboard fitted together to form a series of compartments, and placed in base without being attached to it	Slotting
PARTITIONS (solid)	Any construction of boxboard or other material attached to interior of base to sub-divide it	
PATCH	Piece of paper or cloth over lifts, pulls, support for lid, or hardware inside box	
	Process of removing portion of thickness of board from shell or blank flanges	Peeling

* According to present ruling for Freight Classification: Unless otherwise provided, . . . nesting means that three or more different sizes of the article for which the "nested" specification is provided must be enclosed each smaller within each next larger, or that three or more of the article for which the "nested" specification is provided must be placed one within the other so that each upper article will not project above the next lower article more than one-third (1/3) of its height.

Name of Material Machine or Construction	Definition	Name of Material or Operation
PULLS	Metal handles or pieces of tape or ribbon attached to base of shelf or file boxes for convenience in removing from shelves	
REENFORCING	Strip of paper or string under cover paper	
ROTARY BOARD-SLITTING MACHINE	Machine for slitting sheets of board into sheets of lesser width	
ROUND AND OVAL CUTTING MACHINE	Hand-operated machine for cutting round and oval tops and bottoms	
SCORING MACHINE	Machine for scoring and cutting boxboard	Scoring
SHALLOW LID BOX	A box having a lid of less depth than the base	
SHELL	A glued blank, any shape but round tube, open at both ends	
SHELLS (loose)	Shells used to support layers	
SHOULDER BOX	Box with a glued neck so inserted that ends and sides of base form a shoulder upon which lid rests	
SHOULDER BOX GLUING MACHINE	Machine used to glue in necks	
SLIDE BOX	Box with lid in shell form, into which base is inserted at side or end	
SLITTING MACHINE	Machine for slitting rolls of paper into rolls of lesser width	Cutting or slitting
SLOTING MACHINE	Machine for cutting slots in boxboard for forming partitions	Slotting
SLOTING SAW	Saw for cutting slots in boxboard for forming partitions	Slotting
STAY	Material used for reenforcing corners of base, lid, or tray; may be of paper, cloth, combination (cloth and paper), wire, or metal	
STAYING MACHINE	Machine for reenforcing corners of paper boxes or parts thereof. Available in single and quadruple models	Staying
STENCIL MACHINE	Machine for applying adhesive to edges of paper to be used on wrapping machine	Stenciling
STEPS	Shells or trays of varying sizes attached inside base to raise one row or portion of contents higher than the row next in front; or attached inside lid to hold articles of various heights in place	
STOPS	Pieces of boxboard attached inside of ends of lid to hold base in proper position when height of base is less than height of lid	
TAPE	Woven or braided cotton material	Taping
TELESCOPE BOX	A box with base and lid of the same depth	
THUMB-HOLE	A semi-circular or triangular cut made in sides or ends to facilitate removal of lid from base, or contents from base.	Thumb-holing
THUMB-HOLING MACHINE	Machine for cutting thumb-holes	Thumb-holing
TIGHT WRAP	Lid, base, or tray covered with paper, wrappers being in one piece and having entire surface covered with adhesive	Tight wrapping
TOP	Outer surface of the lid	
TOPPING MACHINE	Machine for attaching top or bottom paper	Topping
TOP-PAPER	Paper attached to top of lid.	
TRAY	A receptacle for which no lid is made	

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Pumps, Taps and Dies, etc., for many branches of
the Government and hundreds of manufacturers
who are making all the things that will contribute
to a successful conclusion of this war.

Our experience in packaging articles for the war effort gladly offered without obligation.

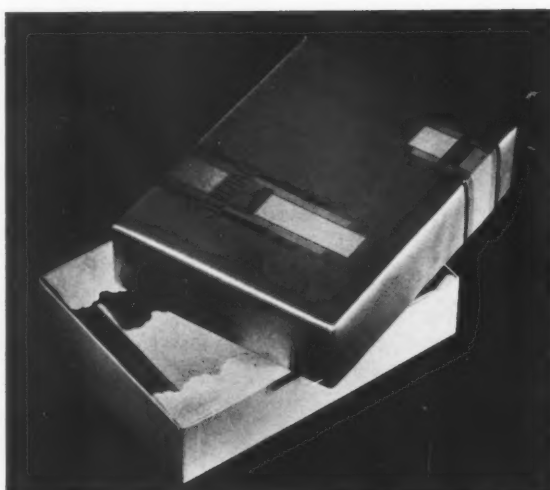
THE MASON BOX COMPANY
ATTLEBORO FALLS, MASS. — 175 5th AVE., N. Y.

Name of Material Machine or Construction	Definition	Name of Material or Operation
TYING MACHINE	Machine for tying boxes in bundles; automatic or hand operated	Bundling or tying
TRIM	Paper or cloth used to strengthen or form decorative covering for the edges of base, lid, or extension edges.	(See <i>Covering</i>)
TUBE	Any cylindrical shell open at both ends Process of turning-in or turning-down the edge of cover paper which extends beyond sides and ends of base or lid in process of covering	Turning in
WIRE CORNER-STAYING MACHINE	Machine for reenforcing corner with wire	Staying

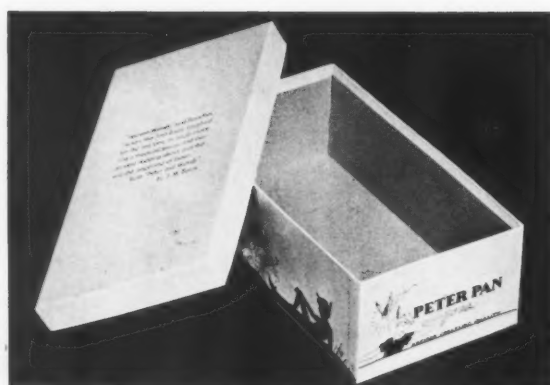
Name of Material Machine or Construction	Definition	Name of Process or Operation
WIRE STITCHING MACHINE	Machine for wire stitching (flat or round wire)	Stitching on flat surface
WOOD FRAME	Strips of wood attached to inside surface of base for strengthening the upper edge	Framing
WRAP	Paper covering for lid or base applied by wrapping machine	(See <i>Wrapper</i>)
WRAPPER	Process of covering base, lid, or tray with paper, by machine, or by hand, wrappers being in one piece and having part of or entire surface covered with adhesive	Tight wrapping Loose wrapping
WRAPPING MACHINE	Machine for wrapping lid or base in one operation	Wrapping

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

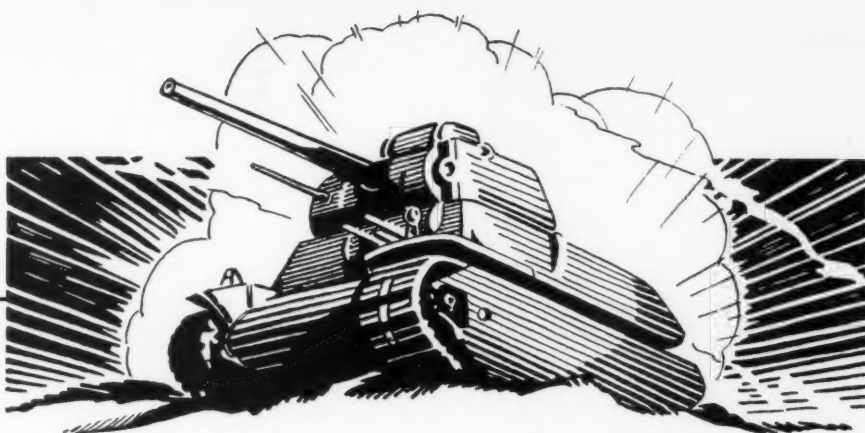
TYPES AND STYLES OF SET-UP BOXES



A telescope type candy box which is loose wrapped. Note that base and lid are of the same depth. Folds at each end of the lid show that it has been loose wrapped. The top edges of the base are trimmed with paper lace. This type of box has a multiplicity of uses—hosiery, lingerie, candy, handkerchiefs, etc.



Shoe box with shallow lid. This type of box is distinguished from the telescope style by having lid of less depth than base. Both lid and base are tight wrapped. Paper covering for base is printed in light green with Peter Pan figures. Lid carries product information.



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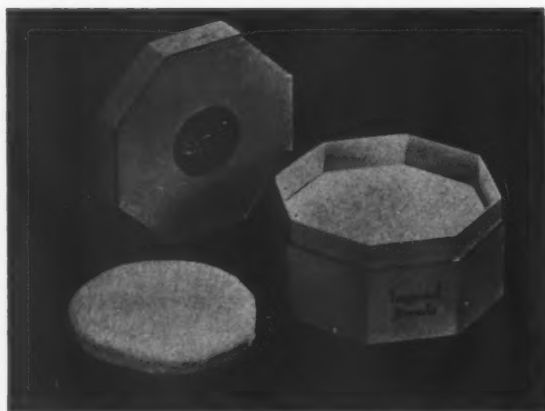
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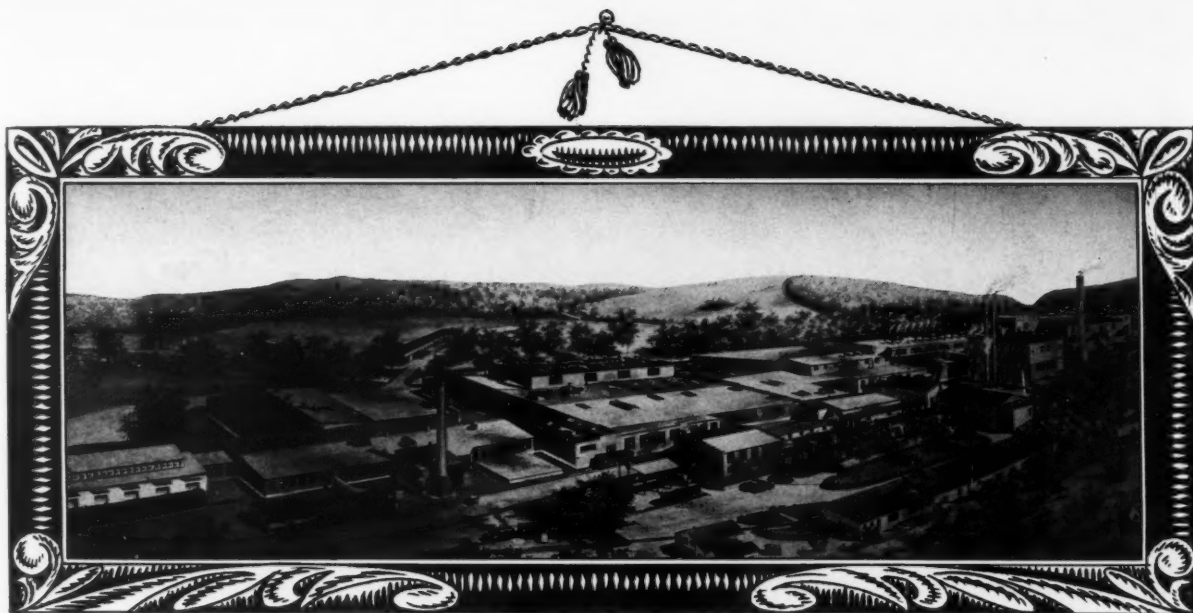
Box for cologne with shallow shoulder. Base and lid are banded, with top and bottom edges trimmed. The bottle rests on a tray within a cardboard frame. A triangle of cardboard supports the neck of the bottle. The inside lid is fitted with a pad of tan velour paper with brand name printed in gold. The top paper is embossed and the bottom paper matches the inside liner in color.



Octagon shape, shoulder box for powder. Base is banded with ivory paper which has gold trim on edges and there is an ivory bottom label. Lid top is set in an octagon shell and banded with ivory paper with red trim on edges. The powder is contained in a non-sift box inserted in the tray. The ivory paper covering the top must be cut away before the powder can be removed. Depth of inside powder box is sufficient to allow room for puff. Lid has embossed label.



Hosiery box with shoulder. Lid is hinged and is loose wrapped with striped paper in gold and ivory colors. The base is tight wrapped in gold paper, printed with brand name. The name is repeated on the inside of the lid, but it is die stamped for added effect.



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Telescope type box for hosiery. Both the base and the lid are tight wrapped. This method of wrapping is used most often for boxes such as this, which are intended for units of relatively inexpensive merchandise. Paper used for wrapping the lid is white and is printed in color with name and product identification.



Toilet water box with a shallow base in which are inserted 4 small individual trays that form the shoulder. Base and trays are tight wrapped as well as the lid which fits snugly on the shoulder. Lid wrap is printed with the brand and product names.



An oval-shape face powder box with shoulder. The base is hand-covered with a printed paper showing a black lace edging on dusky pink and has a dusky pink bottom label. Powder may be seen through window in an inner liner. The lid is covered with pink paper and it has a black trim around the top edge. There is a printed top label with brand name in black.



Soap box with shoulder and a hinged lid. The base is tight wrapped. The lid is banded and the top and bottom edges of the lid are trimmed with gold paper. The top paper has hot stamped decoration. Bars of soap are kept intact with a single shell into which the middle cake of soap fits.

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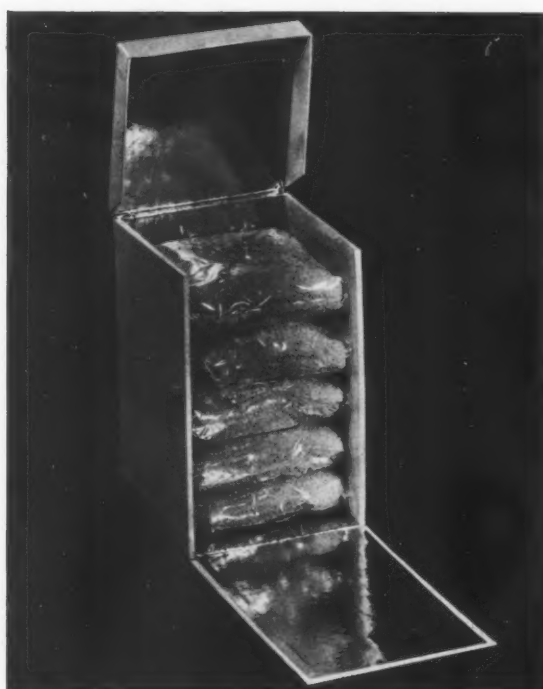
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Call Bridgeport 4-0101

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Box for pen and pencil set. It has an extension edge base, covered with gold lacquered paper, which is tight wrapped. An ivory colored platform is glued to the base and is fitted with elastics. The lid is lined inside with red flint paper and die cut so that the window extends down the front flange. The outside of the lid is also covered with red flint paper.



Shallow lid box for bath mitts. It has a drop front and hinged lid with mitered corners. The insides of the lid and of the base are lined with heavy gold foil. The outside covering is of white flint paper. Lid and base are full tight wrapped. Boxes of this type enhance the quality of the product which they contain and make effective display pieces for windows, counters or other product exhibit space in drug or department stores.



Cosmetic box with extension edge base. There is a die cut platform which holds each item in place and prevents jostling. The lid is full telescope type into which is inserted an ingenious tray. The die cut hole in the tray fits down over the box of powder and keeps all the other items in position.



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Molded Pulp Containers*

MOLDED pulp containers are made from reclaimed or new fibrous paper pulp, combined with binders of certain chemical formulas or plastic resins. The paper pulp may be a mixture of sulphite and kraft. Its degree of strength is dependent upon the amount of kraft used in the mixture. They are cast from molds of bronze or other metals, previously made from plaster models of the desired shapes.

Molded pulp has been used extensively by the poultry industry to protect eggs from breakage during shipment. Millions of molded pulp and pressed pulp pie plates are used annually in the baking industry. These are made with dies and plungers, and are limited to a dish-shaped unit. Another important use is for the protective sleeves used over bottles of liquor. In more unusual shapes, molded pulp, made by the blown method, is used widely for making decorative novelty containers for candy, lingerie, hosiery and all manner of dry merchandise for which an individualized container provides striking counter display. Some 10,000,000 molded pulp units like the pumpkins seen on candy counters, were sold in chain and syndicate stores in 1940. Custom-made molds are also important for trade mark identity.

Molded pulp containers have many advantages: (1) They are light in weight, (2) may be seamless because two halves can be molded in one piece, (3) are crush resistant and (4) offer excellent opportunity for distinctive design and individuality of shapes.

The two important processes for making molded pulp containers are as follows:

1. Suction method: This process is used for mass production of the flat dish types of containers such as egg containers and pie plates. The molds, drilled with holes, are attached to the spokes of a rotary conveyor.

Molded pulp containers are used for a great variety of dry merchandise, such as wrapped candies, hosiery, lingerie, etc. Photo Pulp Reproduction Co.



A fine screen fits over the outside of the mold. As these molds move around the conveyor they are submerged into vats of the pulp mixture. By suction the required amount of the pulp mixture to make the container is lifted from the vat against the screen and pressed by male and female dies. The mold then moves on; the completed container is finally removed from the mold and put through the dryers. The complete operation is automatic and it is possible to make large quantities with great speed and at very low cost.

2. Blown pulp: Molded pulp containers like the boots, barrel, liquor bottle sleeve shown in the illustration are not made with dies and plunger but are made by the blown pulp method. A bronze shell or cavity drilled with holes is lined with a metal screen made in the same shape as the shell. By gravity the pulp mixture fills this cavity and by air pressure is forced against the screen within the mold and is also dried by super-heated air. When the unit molded is dried sufficiently, the mold opens automatically, the unit is removed and passed along on a conveyor for further drying. After that the container is ready to have decorative effects applied. Production is about 20,000 a day.

Decoration

Color effects may be achieved by dyeing the pulp material to the desired shade or by applying color with a brush or spray. The containers may be lacquered to provide a high glossy luster. Lettering and trade mark designs may be incorporated at the time of molding by embossing or debossing. Labels may be affixed later.

Molded pulp containers such as those illustrated are obtainable in stock molds. When an unusual design is required, an individualized mold may be made. Bronze molds may be made on the average from \$150 to \$500.

New developments

Many new uses and developments of molded pulp may come as the result of material shortages due to the emergency economy. Reports are that experiments have been conducted to develop paper pulp as a substitute for cork. Molded pulp protective pieces to protect corners of furniture during shipment have also been used successfully in place of corrugated materials. They are easy to handle because they can be made in the exact shape required.

Another recent development is a molded pulp product carrying a synthetic resin content, reputed to have all the advantages of plastic molding compounds plus greatly increased strength and latitude in color and decorative effect. Eventually this material may have a part in the packaging picture.

* Users of molded pulp are advised to consult WPB Order M-241-a and amendments.

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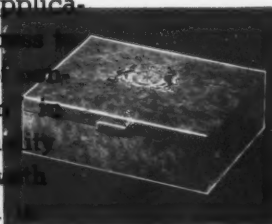
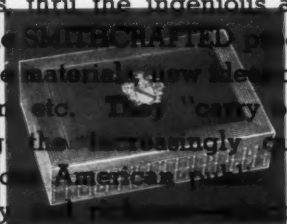
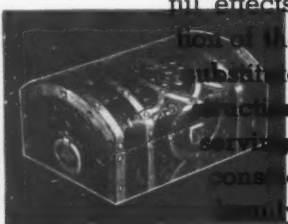
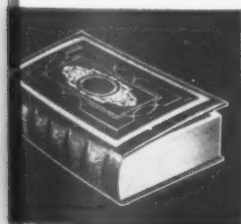
NOT A WAR CASUALTY

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PACKAGING CATALOG

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Molded Wax Containers

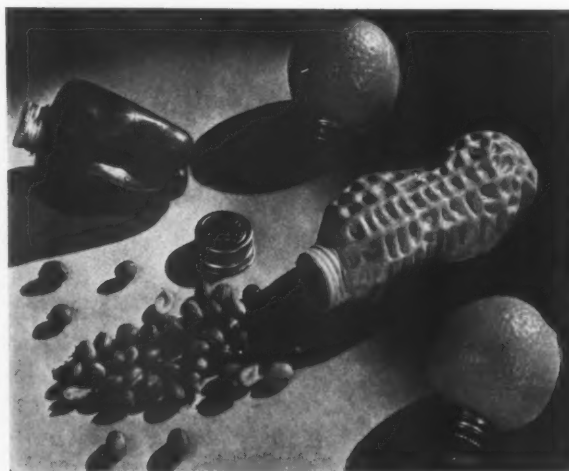
by S. W. Cornwall

MOLDED wax containers of various types have been in use for many years, for a wide variety of purposes. Hydrofluoric acid, for instance, has been successfully handled in wax bottles for decades. The confectionery industry has for many years been selling a novelty confection consisting of small wax bottles, two or three inches high, filled with sweet syrups. Silver nitrate solution for hospital use by doctors is packaged in small wax bottles or capsules. Small novelty containers cast and colored as pumpkins, and other holiday items, have been in general use for a long time.

Several new types of waxes have been developed and produced on a commercial scale in recent years permitting the production of high-melting, hard, tough and strong mixtures. These have made possible a much more general application of wax mixtures to container problems. Containers can now be made which are tough and resistant to shock in handling and shipment. This improvement has greatly widened the field for such containers and has put them in the utility as well as the novelty class. Higher softening points of such wax mixtures have made possible their use as a package for summertime use, even in relatively hot climates.

Characteristics: Molded wax containers can be made in any shape which can be cast in molds. Colors can be put into the material, or the pieces can be painted after they are cast. Clear and brilliant colors in a wide range are obtained by using various dyes and pigments with the melted wax. Light tints are easily obtained and the waxes combined with pigments give a snow-white mixture. Molded wax items can be made brittle and hard, or soft and tough, as required, by controlling the proportions of the various waxes used. Resistance to summer temperatures is obtained in the same way. Inasmuch

Molded wax packages are an interesting means of marketing products such as fruit drink powders, peanuts and the like. Photo W. & F. Manufacturing Co.



as hard waxes with higher melting points are, in general, more costly, this factor has to be taken into consideration.

Uses: Molded wax mixtures are especially suitable for making containers which, by their design, shape and color indicate the nature or use of the contents. For example, a peanut shell about five inches long may be filled with peanuts, and has the advantage of eye appeal coupled with excellent protection of the contents, being tight against air, light and moisture. An orange or lemon of wax may be filled with powder for making soft drinks.

The small molded wax bottles containing syrup previously mentioned can be made in any shape or color but are usually white or translucent so the color of their contents can show through. These small bottles are used by the millions throughout the United States, and throughout the year. Similar packages are used in the pharmaceutical and food trade as single dose containers, or as substitutes for gelatin capsules or small glass containers.

Molded wax packages and bottles can be made completely moistureproof and are suitable for small packages where this characteristic is needed. In addition they can be made lightproof by using coloring materials and pigments. These two properties make them especially well fitted for a product like salted peanuts which have to be protected from air, light and moisture.

Materials: The principal raw material is refined paraffin, with other waxes used in varying amounts. Various colors and pigments are used for coloring, and small amounts of other chemicals are added to impart toughness and heat resistance to the finished piece. Most of these materials are at present available without governmental restriction.

Methods of Manufacture: Molded wax items are cast in metal molds, each mold holding several or many pieces, depending on the size. Molding is done on large semi-automatic casting machines, the only hand work necessary being that of emptying the mold. Decorating operations of painting, spraying etc., are carried on by methods similar to those used on other materials. Every effort is made to embody the color of the finished piece in with the casting itself, to keep decorating costs to a minimum. Special finishes have been developed to give a lacquered appearance and hard surface.

Cost: When made in quantity the cost of the wax molded container is relatively low, due to the use of automatic equipment. Mold costs, however, make production of a small quantity more expensive. The syrup-filled bottles are generally produced so as to retail at one cent each. Smaller items are packed several dozen to a box, with partitions, while some items can be shipped in bulk.

Wax plastic containers offer new and interesting possibilities for people using packages for food and candy.

90th Anniversary 1853 ★ ★ 1943

Facsimile of the announcement of the Butterfield-Barry Company, successors to H. A. Butterfield and Company

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By ye

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New York, July 2nd, 1906

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Capital Stock paid in \$120,000

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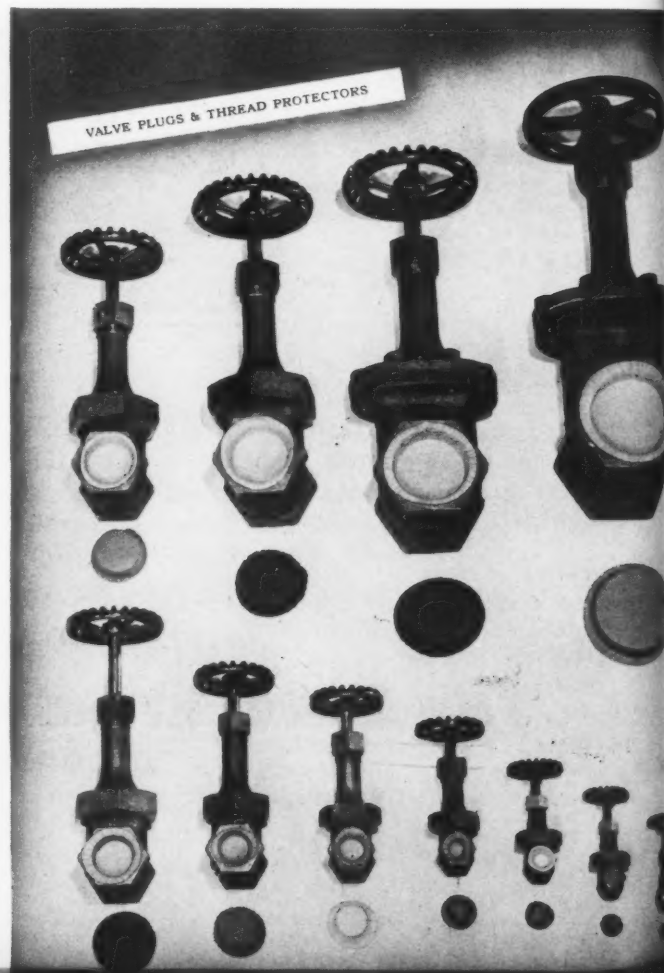
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Packages of Wood

by Lawrence Pilliod

LONG used for fancy packages, wood has now demonstrated that in the absence of metals and plastics, it can be fabricated into an ideal container for tools and precision instruments. Large size wooden containers for "fancy" goods are not being widely produced at the present time, but smaller pieces such as compacts and lipstick containers are being produced by at least one concern.

Wooden tool kits, fitted with hinges and handles, are doing double duty as both storage and carrying cases. By methods of drying and processing, most of the moisture normally found in wood can be driven out and the wood protected against re-absorption of water which would ordinarily cause warping and swelling. Waterproof adhesives and finishes further facilitate the production of wholly weather-proof cases and add to their utility.

Wood packages for these specialized uses cannot be produced in every plant equipped for woodworking. It is to the advantage of a tool or precision instrument producer to confer frankly with the makers of wood cases. A sample of the intended contents—or at least an accurate sketch of exterior shape and dimensions—is almost a prerequisite to getting a satisfactory kit. Wood is readily adaptable to the varied shapes and uses in this category and the cases can be lined as simply or as expensively as the product may require.

Probably the most popular material for wood containers is gumwood, though most of the cabinet hardwoods—cedar, walnut, mahogany, oak, sycamore, poplar and maple—are equally usable. Cedar was popular as the material for storage boxes because the odor is generally presumed to be a moth preventive. Veneers frequently cover less expensive woods used for the frame, or the covering may be of embossed paper, simulated grain fabrics and leather-like sheets. Special machinery, however, is necessary to apply such final finishes. In the days of luxury containers, silks, satins, duvetyns and even mirrors formed all or part of the interior finish.

Reuse of wood containers

One reason why wood packages have been so popular is their re-use value—candy makers have filled smart-looking containers with their product but designed the box to be used afterwards as a jewel case or handkerchief box. Men's belts and jewelry frequently were sold in wood cases that later were adapted as cigarette boxes.

A New England firm, scenting the scarcity of metals in the event of war, several years ago began experimenting with the fabrication of wood into compacts and lipstick cases in spite of the difficulties of acquiring the minute tolerances necessary to keep them functioning. Now all-wood compacts include even the wooden dowel-

pin for the hinge, and lipstick containers seem to work as well as their metal predecessors. Wooden flashlight housings are in experimentation or near completion stages, made by this same firm. Die-cutting is one of the metal trade tricks that has been adapted to fabricating things of wood. A special process for sealing the pores of the wood makes permanent accuracy of contact points possible and avoids moisture absorption which would throw the container out of gear.

Packages of wood will—it appears—serve through the war and survive it in many new servicing jobs.

Above: Sturdy wooden boxes of this type serve to house chronometers and similar delicate instruments. Below: Wooden tool kits are popular with defense workers and home craftsmen. Weatherproofed and reinforced they serve many purposes. Photos Pilliod Cabinet Co.





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PACKAGING CATALOG

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Substitutions in Fancy Packaging

by Milton Weill

ESPECIALLY hard hit by war's privations have been those lines—jewelry, cosmetics and the like—in which fancy packaging has always been the indispensable practice. They have suffered not only because of shortage of the materials from which their products are made, but they have been deprived of many of their accustomed materials for packaging. This has had two results: First, a cheerful acquiescence in complying with restrictive orders as their contribution to the war effort, and, second, a manifestation of ingenuity in the use of substitute materials for packaging. The way in which these substitutions were effectively developed in many of the industries will serve as an inspiration to others in the packaging field who are being forced to make similar changes.

In the jewelry field, where metal containers have for many years been the most widely used, three changes have developed. One, a type of pulp material was found, that could be pressed or embossed into shapes similar to those previously stamped out of metal. The same mechanical covering equipment was found to be usable, provided the inside dimensions of the new types of cases were the same as those of the metal containers previously used. It was thus found possible to continue the use of most of the equipment and dies formerly used for "finishing" the linings and inside fittings of the cases. In the jewelry field, metal containers had for the most part been covered with either imitation leather, velvet or fancy fabrics. In recent years some of these cases were stamped out of brass and then given either a high polish or a satin finish. In many other instances, these metal cases also were engraved with fancy designs made possible by the use of drop hammers. In using this new pulp material as a substitute, however, the only type of

jewelry case that can be developed is the type that is covered with either imitation leather, velvet or other types of fancy fabrics. The polished brass finish is no longer possible for the duration.

The second type of substitute being used in the jewelry field is the change from metal to cardboard, the cardboard then being covered with imitation leather, velvet, etc. Only those shapes which can be made out of scored cardboard are possible. Fancy shapes, except for such things as octagon corners, and certain types of extension bases, are not possible under this process of manufacture. It is interesting to observe, however, as is shown in the accompanying photographs, that when these boxes are open for display purposes, they present a most effective setting for the merchandise they hold, and at the same time make a very acceptable gift package. In the case of these cardboard boxes it is again possible to use the same inside fittings previously used on metal containers.

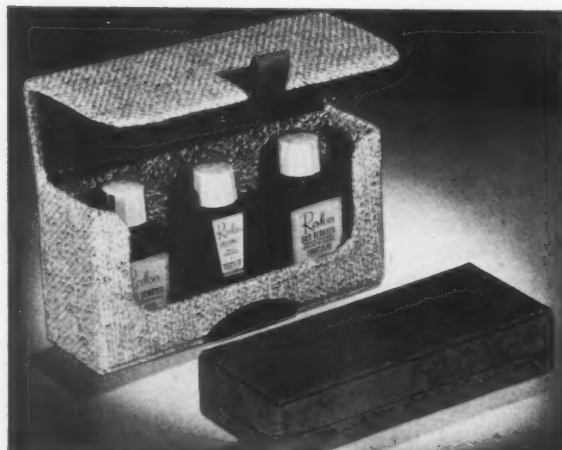
Wood packages making good

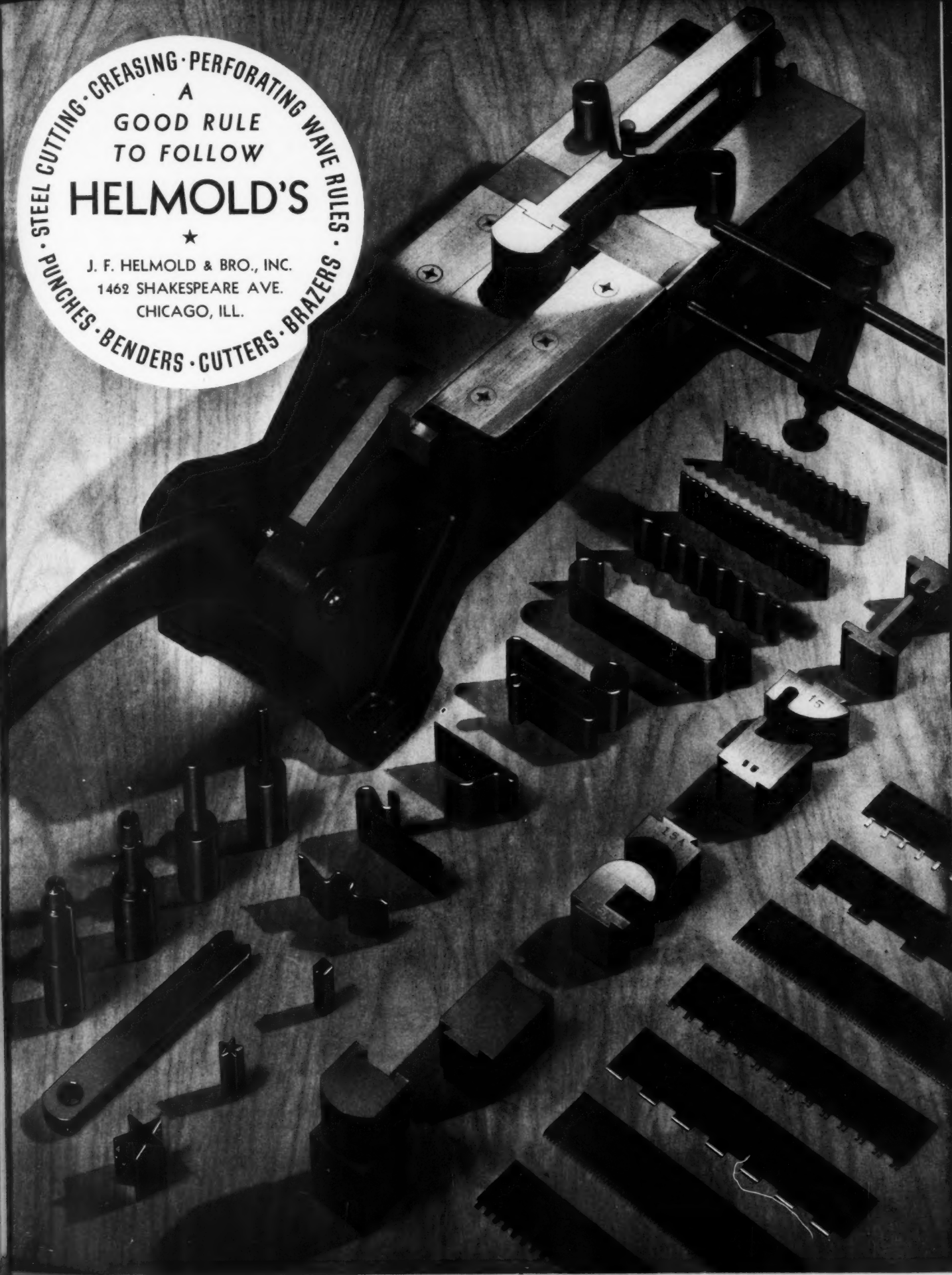
The third substitution is wood. Here a wide latitude of designing effects is possible. Many interesting wood packages have already found their way to the market. Wood boxes are almost entirely hand-made, so naturally may be used only for the more expensive types of jewelry items. A wide variety of finishes are still available, ranging from natural wood effects to any color lacquer finish.

All in all these three types of substitutes for the metal which up to now has been the most widely accepted type of jewelry container, enable the industry, without any visible sacrifice, to continue presenting to the trade effective containers for their jewelry items.

In the cosmetic field the same transition has taken place. Lipsticks, for instance, are now being made in

Left: Cardboard frames covered with fancy fabrics serve in place of metal frames for decorative boxes. Right: Wood and glass continue the sales job and consumer packaging task in wartime. Photo Arrow Manufacturing Co.







wood as well as in cardboard, and many unusually effective designs have already been put on the market. They make a very acceptable appearance and are practical to use. Wherever they have been introduced they have been accepted by the consuming public as a "war baby."

In the compact field some manufacturers are changing over also to types of compacts involving the use of wood, cardboard and combinations of these materials. They are practical and durable. Those of cardboard construction do not allow for fancy shapes, but they do permit interesting design and effective use of novelty cloth coverings, such as bengalines, moires, rayons, novelty ribbed materials, interesting printed cloths, etc. In the case of those of wood construction, natural wood finishes give artistic effects. In other cases, the wood combined with leather or imitation leather coverings give added opportunities for the designer's skill.

Leatherette and coated fabrics

These materials have developed a new usefulness since priorities and restriction of basic materials have been made necessary as war emergency measures. Leatherette, otherwise known as artificial leather, and keratol, coated fabrics, etc., because of their substantial durable construction, have always been favored as covering materials of those types of containers, boxes or cases of a semi-permanent or permanent nature. The fact that in many cases their appearance so closely resembles leather, has made this type of material the ideal fabric to use wherever "leather effect" was demanded. Leatherettes have always been used in the field of metal containers, and have also been widely used on cases and boxes of wood construction, but today they are being used as an ideal covering material for cardboard boxes. Cardboard is the least expensive and the most practical material for a wide variety of box purposes. It is also among the most available materials on the market today; consequently leatherette is being used with cardboard to present a substantial package. Ordinarily, paper-covered boxes do not present the durable, substantial appearance of leatherette-covered boxes. It should be noted, however, that just in recent months manufacturers of leatherette have been forced to curtail their production because of government restrictions placed upon the use of pyroxylin and castor oil—two important ingredients used in the manufacture of leatherette.

In fields such as the jewelry and cosmetic fields, where packages of durable construction are required, leatherette has found a new enlarged place for itself. While it continues to be used on all types of other boxes, its enlarged sphere of use is unquestionably in the field of cardboard containers. In many cases the use of leatherette has been so effectively made part of the new package that the consumer does not see any difference or sense any change from the original package.

Upper: How all-paper-and fabric jewelry boxes replace their metal-framed predecessors. On the right, vertically, are the metal base boxes, on the left in each instance, the 1943 product. Below: The upper box has a metal frame, the lower is wholly non-critical. Photos Arrow Mfg. Co.

BAGS

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Paper Bags

by George E. Chisholm

THE paper bag entered the field of packaging before the Civil War. Used first as a convenient and economical method of carrying items from store to home, it takes its place today along with glass jars, tin cans, and cardboard cartons as a basic material in modern packaging.

Some of the reasons for the increasing importance of the paper bag in recent years in packaging are:

- 1) Automatic packaging machinery has been developed for the filling and sealing of paper bags.
- 2) Methods of heat-sealing for paper bags have provided a tighter seal.
- 3) Better protective papers have been made available for paper bags.
- 4) Protective coatings have been introduced to make paper bags more efficient.
- 5) Better designing and printing have given the paper bag more shelf appeal.

The present scarcity of tin, burlap, foil and other packaging materials has brought about the use of paper bags for a large number of products formerly packaged in other types of containers. Lend-lease and military shipments include bags of almost every type from small envelopes for lemon drinks to heavy-duty bags carrying 100 lbs. or more of chemicals or foods. Bags-in-cartons have made possible many conversions from metal packaging to paper.

At first thought, "bag" ordinarily connotes the brown paper bag which is used by every corner grocer, but this does not properly fall into the formal classification of paper packaging. Better examples of the latter are the bags used for: Coffee, Flour, Sugar, Potatoes, Rice.

The definition of paper packaging comprises those paper bags that are filled and sealed in quantity before they reach the point of retail sale. The filling and sealing may be done at the factory, refinery or roasting plant,

or by the grower, receiver or wholesaler. When the paper packages reach the retail outlet, they are stored, displayed, and sold to consumers as a complete unit.

There are four basic types of paper bags, all of which are illustrated on this page. Whether used for packaging or wrapping, paper bags fit into one or more of these classifications.

Variety of papers available

A variety of papers is available for bags according to the requirements of the product to be packaged. Kraft papers are used for strength, with a double thickness of kraft paper where added protection is required; e.g., the double-walled kraft bag for packaging of sugar at the factory. The second thickness of paper assures added protection against outside moisture, dust, dirt, and other contaminating matter, and also enables the package to withstand handling in shipping, storing, and delivery.

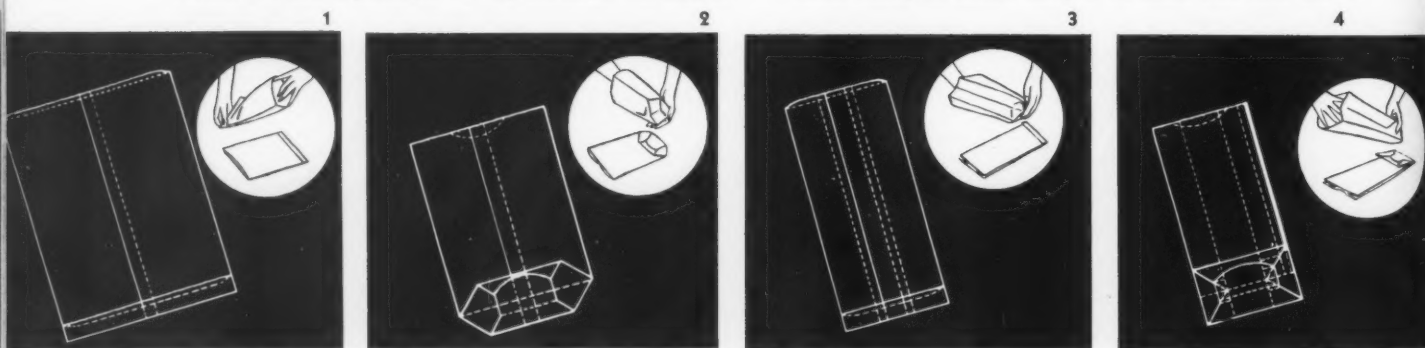
Where the product contains oils which would seep through paper, an inner protective liner of glassine is often used. Examples are the bags used for coffee, to prevent oils from coffee coming through the outside paper and bags used for salted nuts. Waxed paper liners are used in other cases to prevent grease or moisture from finding its way out of the package.

Where especially greasy products are to be packaged, a parchment paper is often used. Lard is packaged in such a bag; so is sausage meat. Many other combinations of papers are available to meet particular conditions. A study of the conditions of packing, storage, shipping, and handling will determine the paper or combination of papers to be used.

There are laminated combinations today to provide protective barriers to meet the requirements of practically any product that can be distributed in bags.

Basic construction of bags used in packaging may be divided into four classifications. 1. Flat bags: First type of bag developed and simplest in construction; also cheapest to make. It has one lengthwise seam, the bottom is simply folded under and pasted. There are many variations and improved features. 2. Satchel bottom bags: The feature of this bag is its bottom construction which, when filled, provides a flat base. Named for its resemblance to a leather satchel traveling bag, it is roomy and results in a neater package. 3. Square bags: An adapta-

tion of the flat bag with the same folded-up bottom. It has bellows fold or accordeon pleat in the sides, which reduces the width of the closed bag without reducing its capacity. It lends itself to high-speed production. 4. Automatic self-opening bag: The last word in bag making, the automatic bag combines desirable features of previous types. It has bellows fold in the sides and an improved bottom. When filled it makes a neat, squared-up package with stable base. It may have center seam, as shown here, or be made with side seam.



THERM-O-TOP

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BRANCHES IN PRINCIPAL CITIES

*It's Patriotic
to pack in
paper!*

PACKAGING CATALOG

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Large size multi-walled bags are used as shipping containers for many products; e.g., coffee, sugar, and rice. The individual units for consumers are packed in these paper shipping containers for bulk shipments. In the case of sugar, 60 lbs. are packed in units of twelve 5-lb. packages, six 10-lb. packages, or thirty 2-lb. packages. Shipping containers for coffee hold 24 1-lb. bags.

Paper bags are widely used as a wrapping material, in retail establishments, where individual purchases are placed in the bag so they can be carried home conveniently. Usually the only closure is formed by folding over the top of the bag. Some of the familiar forms used in this manner are:

- Grocery bags (you carry your supplies in them)
- Paper sacks (used in the super-markets)
- Notion bags (for flat, small objects)
- Millinery bags (same shape, larger size, for hats)
- Garment bags (used by dry cleaners)
- Liquor bottle bags (long and narrow to fit bottles)
- Candy bags (used in every candy store)
- Bread bags (just fits a loaf of bread)
- Window bags (with a transparent window)
- Shopping bags (large, of heavy kraft, with satchel-bottom and twisted paper handles, for carrying)
- Beverage bags (short, automatic, with twisted paper handles, for bottles of soft drinks)
- Bru bags (automatic, heavy, moisture-repellent kraft for wrapping products taken from refrigerators)
- Nail bags (automatic, heavy kraft, shorter than grocery bags, used for nails in bulk and other hardware)

So many types of bags may be manufactured on special order that it is impossible to include a listing of all of them. A few examples, however, will give an idea of their wide application.

Tarnish protection: Anti-tarnish papers of various kinds (i.e., papers formulated to be free of sulphur) are being made into flat bags of many sizes to provide protection for individual tarnishable items and are being used extensively for packing silverware. This development is a progressive step over the former use of these materials as wrappings. The use of anti-tarnish bags provides a neater and more lasting protection and is therefore desirable because it makes many products more readily identifiable and salable.

Cotton-lined bags: To protect the delicate surface of mirrors, china, and glass, and to protect silverware from tarnish, excellent cotton-lined bags have been made available during the last few years. The cotton is first bonded to paper and the completed padded sheeting is then worked into bag shapes, usually with sewn edges.

Automatic bag with transparent panel: To provide the appeal of visibility for a variety of products, automatic bags are made with a panel of cellophane the entire length of the bag. However, such containers are highly restricted during this period due to the limitations on the use of cellophane and shortage of labor and manufacturing facilities.

Over-size and odd shapes: For an unusual shape—a long narrow bag for an umbrella, a huge cellophane bag in which to display a grand piano or an automobile—certain companies are equipped to fill the order.

5. Paper bags for packaging are usually defined as those filled and sealed in quantity before they reach the point of sale. Best examples are those used for coffee, sugar, flour, potatoes, beverages, etc. Photos Union Bag & Paper Corp.

5



EUREKA



IN WAR...

Wood Boxes and Cases For Instruments, Ammunition and Spare Parts.

Fabric Kits, Bags, Pouches, Rolls and Other Stitched Items for Tools, Instruments, Flags, etc.



IN PEACE...

Fine Wood Cases and Chests For Silverware and Cutlery. Fabric Rolls and Bags for Merchandise Worth Packing Well.

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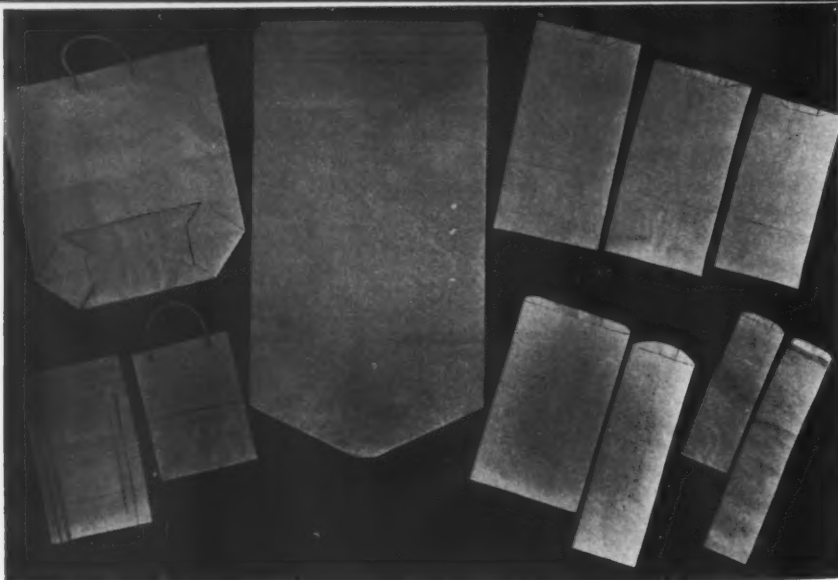
INCORPORATED

TAUNTON

MASSACHUSETTS

PACKAGING CATALOG

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6



7

6. Paper bags used by retailers. Top, left to right: shopping bag with twisted paper handles, garment bag, bru bags of moisture-repellant kraft. Bottom, left to right: nail bags, beverage bags with carrying handles, bread bags, long narrow liquor bottle bags. Photo Southern Kraft Corp. 7. Bag-in-carton packages of paper and protective films used to replace cans for foods.

Sample mailing bags: Many small bags of various materials are now being made as direct mail pieces for samples, promotional stunts, etc. These have a mailing card attached to the bottom, carrying the advertising or promotional copy and a space for name and address.

The user of bags today must study his requirements carefully. There are three important considerations in making selections: First, to decide what type of paper or laminations of paper with other materials will give the required protection for the job to be done. Second, to determine whether such materials are available if the product to be packaged is for civilian distribution. Third, to study carefully the government directives concerning the supply of bags and paper supplies.

There are not only restrictions on paper materials used for bags, but on the various resins for adhesives and sealing compounds as well as shortages of metal for closures. Such limitations may completely change the type of materials to be selected. A careful study of the sections in this book on papers, laminations and government orders will be advisable before going too far with packaging plans during the war period.

Methods of filling and sealing paper packages are out-

lined in another section of this book (see page 438). The use of filling and sealing machinery has contributed much to the usefulness of paper as a packaging material.

There are four basic shapes of paper bags. Each is illustrated on page 140. Whether used for packaging or wrapping, paper bags fit into one or more of these classifications.

The paper bag is among the most economical methods of packaging. Machines for making bags are so highly efficient today that it is possible to buy as many as 30 to 50 standard size paper bags for one cent. Modern high-speed machines are capable of meeting almost any production schedule to fill orders quickly under normal conditions. A single bag machine—depending upon the type of bag being made, the grade of paper used and the machine itself—is capable of turning out in excess of a third of a million bags a day, ten every second.

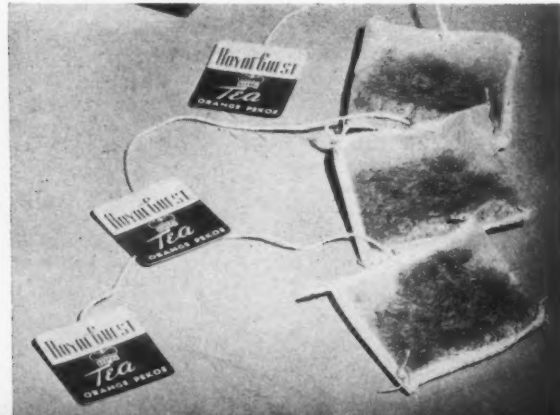
When bags began to take their place as standard containers for tea, coffee and spices and other food products, the value of printing became important from an advertising standpoint. Today practical printing processes as well as specialized equipment have been developed for printing product and trade identification on bags.

8. Tarnish-proof flat bag of cotton bonded to paper used to protect silver, etc. Photo Cottonluxe Mfg. Co. 9. Tea bags of fibrous paper. Photo National Tea Bag Co.

8



9



Still
Oneida Packages More Things Better for Less!



• In war as in peace... the solution of packaging problems is a routine matter with this company. Scarcely anything is made which, in part or entirety, has not been packed in an Oneida bag at one time or another. This includes such a wide range of commodities as pistons and pumpnickels, bearings and brassieres, panties and pretzels, donuts and doilies, flowers and flanges, gears and grapes.

It is entirely possible, therefore, that we have already solved your packaging problem. If not, we probably can. Try us.

Stock Size Items

Flat, square and satchel bottom cellophane bags • flat and square glassine bags • waxed glassine bags • duplex doughnut bags • die-cut flat confectionery envelopes • a-b-see window bags • duplex confectionery and nut bags • sandwich bags • garbage bags.



Made-to-Order Items

Printed and plain bags and envelopes of cellophane • regular and waxed glassine • white wave • m. g. striped • parchment • kraft and special grades in all popular styles and sizes • also cellophane wrappers and rolls • heat seal and laminated bags • inquire.

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Transparent Bags

WHEN some of the first transparent wrapping material, called fenestra paper, was imported from Belgium about 20 years ago, it was considered so valuable that the first manufacturers to adopt this new packaging material for egg noodles guarded it in a safe.

The growth of the use of transparent materials and the reduction in cost of producing such materials during the past decade have been most significant developments in the history of packaging. Endless possibilities have been opened up for the packaging of thousands of products heretofore sold in bulk.

Before the war, greatest emphasis was on the use of this material for its merchandising advantage of eye appeal. Now, and for the duration, its most important characteristic is its protective quality. Transparent materials for purely display purposes have been completely limited by government orders (see chart "Government Controls" pages 12-13) but their uses for essential packaging have been increased manifold as alternates for metal and other now scarce materials.

Aside from these restrictive measures there are practically no limitations on the applications for transparent bags except those set by the size, shape, weight, fluidity or other characteristic peculiar to the product to be packaged.

Among the most commonly used materials for transparent bags is cellophane. This completely transparent sheeting is lustrous, durable, flexible and impervious to air, grease and dirt. Bags made of this material and the characteristics of each are as follows:

Plain transparent (P.T.): All product not affected by moisture may be packaged in plain transparent cellophane bags, usually designated as P.T. Such products include in normal times a long list of fruits and vege-

tables, candies, apparel accessories, dry goods, soaps, stationery, noodles, popcorn, moth balls, spices, seeds.

Moisture-proof transparent (M.T.): Any product that should retain moisture or be protected from atmospheric conditions, requires the protection of moisture-proof cellophane bags, designated as M.T. Such products include perishable foods, Army rations and medical supplies, metal items that are subject to corrosion, etc.

Moisture-proof heat sealing (M.S.T.): Bags made of cellophane with heat-sealing qualities inherent in the sheet. This material can be sealed to itself without the use of adhesives by the application of heat.

Moistureproof heat sealing, anchored (M.S.A.T.): Bags of cellophane made of material designated as M.S.A.T. provide greater moisture protection than those made of M.S.T. cellophane. This material is designated as "anchored" because of the process by which the coating is applied. It is used widely for frozen food bags.

Color: Cellophane bags are available in eight colors: red, green, blue, pink, orange, amber, orchid, and violet.

Printing: Transparent cellophane bags may be printed by letter-press, aniline, or gravure, in one to six colors, by means of type set-ups, zincs, halftones, or process plates. (One company prints up to seven colors by gravure.)

Either the inside or outside of the walls of the bag may be printed. Printing on the inside of the film known as reverse printing is used when a brilliant effect is desired and when there is no possibility of the printing inks affecting the packaged commodity. Duplex bags are usually printed in reverse on the inside of the outer wall.

Construction of bags

Cellophane bags are made in three standard styles: flat, square, and satchel bottom. (See page 140.)

1. Small machinery parts are protected from grime and corrosion in small cellophane bags. Also for easy identification.
2. Shelf life of many perishable products like popcorn, potato chips, etc., is lengthened by the use of cellophane.



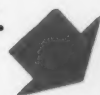
Pack it in **PAPER**



Paper heads the list of materials which are still available for packaging. Union Paper Containers are successfully filling the requirements of an ever-widening variety of products and commodities. Have you thought of paper for your products?

UNION BAG & PAPER CORPORATION

WOOLWORTH BUILDING • NEW YORK • N. Y.





CONVERSIONS

THE *Problem*: Packaging in 1943—and the future.

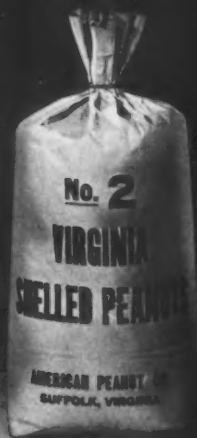
THE *Answer*: Union Paper Bags.

Union Paper Bags have already stepped in to fill many gaps which were opened when other types of packaging mediums were drafted for war needs. In this service, time and experience have now proved the paper bag to be practical, protective and economical.

You will find Union Paper Bags being used effectively as replacements for tin in the Coffee, Tea, Spice and Dog Food Industries, to indicate but a few. And you will find them pinch-hitting for cloth and fabric materials, and for wooden crates and barrels in many of those fields where larger-unit shipping containers are needed.

Small, consumer-sized units for retail distribution. . . Large, multiwall containers for bulk shipments. . . In either of these two groups—or somewhere in between—may lie the happy solution to your own packaging problem.

MULTIWALLS





3. Opaque cellophane envelopes for dehydrated soups have solved the wartime problem of replacing metal foil.

Single or double wall: All three types of bags (above) may be obtained in either single or double wall (duplex) construction. Duplex bags are used for extra protection against shipping or handling hazards and where weight or bulk of the packaged commodity make necessary greater container strength. Specific protection requirements are met by having inside and outside walls of the bag made of different films. Cellophane bags used in the Army Ration K packages, for example, are two thicknesses of this transparent material.

Closures: Transparent bags may be closed by twisting, heat-sealing, crimping, stapling or with cellulose tape. Cardboard headers are often used, especially on plain bags, as part of the closure. They may carry the name and trade mark of the product, and often some promotional or required informative copy. Holes may be punched through the header so that the bags may be hung on special display racks.

Sizes of bags

Transparent bags may be made up to order in virtually any size in widths from $1\frac{1}{2}$ in. to 14 in. and in lengths from 3 in. to $17\frac{3}{4}$ in.

Unprinted bags are available in stock sizes which are fairly well established throughout the industry. The number by which these bags are designated indicate their nominal capacity, but it is obvious that the capacity of the bag varies with the bulk of the product to be packed.

1. Flat bags: 1-oz., $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., and 2-lb. sizes, as well as in a size designated as No. 1 Peanut and designed to hold 1 oz. of nuts.
2. Square bags: same as above plus a 6-lb. size, and four special small sizes.
3. Satchel bottom bags: designated as $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., and 1-, 2-, 3-, 4- or 5-lb.

Transparent bags may be filled by hand or by machinery. Granular products, such as sugar, small confections, seeds, etc., are loaded by the use of a hopper or a funnel-loading device. Many excellent automatic weighing and loading machines have been developed.

Glassine

Because of their semi-transparent quality, due to certain treatment in fabrication (see section on Papers), glassine paper bags deserve an important place in this classification of transparent bags.

Bags of glassine are made in standard-type construction or in special types and are available in many sizes. They are used widely in many industries because of their excellent protective qualities.

Glassine bags are given their maximum degree of transparency and gloss, and their grease-proof, moisture-proof, and heat-sealing characteristics by means of lacquer and wax coatings.

Many of these lacquer-coated glassine bags are used extensively for the same purposes as cellophane, e.g., containers for potato chips, popcorn and small confections, which require a high degree of grease and moisture protection.

Waxed glassine bags used as liners for cartons are a mainstay in the manufacturing of cereals and crackers, because liners of this material assure long shelf life for these products and keep them fresh until they reach the home of the ultimate consumer.

Glassine takes attractive color printing in accurate register, and is strong enough to stand the strain of all stages of high-speed machine wrapping processes. It is available in several colors. If chlorine-bleached white papers should become scarce during the coming year, it is predicted that many packagers will turn to bright amber-colored glassine.

Because of the shortage of glassine paper, however, bags of this material have been limited for the packaging of such items as hosiery, lingerie, notions, hardware, etc.

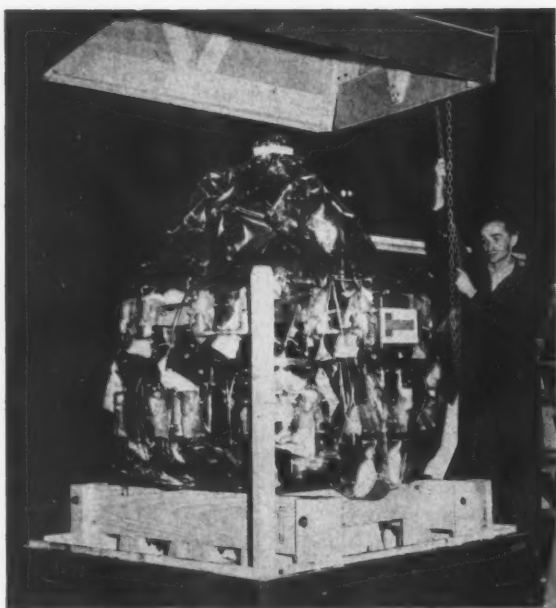
Rubber hydrochloride

The present rubber situation has cut off entirely the possibility of using rubber hydrochloride sheeting for civilian packaging purposes. The makers of this material have announced that practically the entire production is now being used for making the bags in which airplane engines are protected against corrosion through the dehydration method during shipment to war zones.

In the field of transparent packaging, however, rubber hydrochloride sheeting offers many advantages which will be in great demand once the war is over.

This material is impervious to, and thus not affected by dilute acids, air, alkali, brine, grease, normal heat and cold, moisture, mold, oil, and water. In addition, it is dimensionally stable throughout the entire humidity range, durable, non-explosive, and inflammable only slowly and with great difficulty. It takes printing easily, has great tensile strength, shows good resistance to puncture, may be closed by heat-sealing, sewing, or adhesives.

Rubber hydrochloride sheeting is made in a crystal-clear transparent type as well as in a wide range of transparent and opaque colors. It is not a coated material but homogeneous; that is, the same substance throughout. Because of this fact, heat-sealing effects an actual



Bags of rubber hydrochloride sheeting protect airplane engines from corrosion en route to far-distant war zones. Photo The Goodyear Tire and Rubber Co.

fusion of the material and creates an air-tight bond stronger than either sheet. The moisture-proof quality that keeps flavor inside and air outside, together with rapid, thorough sealing, has brought hundreds of flavor-sensitive products into the transparent packaging field. Special inks for printing the surfaces of rubber hydrochloride sheeting provide many opportunities for display.

The two most common types of bags made from rubber hydrochloride sheeting are the regulation flat and square (or gusset) forms. Open-end pouches, resembling a shortened satchel-bottom of the conventional type, are used for the packaging of soft or semi-solid products such as processed cheese. The open end is usually folded and sealed to form the completed package.

Rubber hydrochloride bags, laminated or otherwise, enclosed within paper containers have proved successful for the packaging of many products, notably coffee. Laminations of rubber hydrochloride sheeting with paper and foil are also used in bag form.

Because it is soft and durable and can be sewed, rubber derivative sheeting has opened a broad new field for economical yet distinctive re-use or "merchandise-container" packaging which will return after the war.

Metal Foil Bags

FAMILIAR metal foil envelopes and bags used before the war for the packaging of dehydrated soups, vegetables and fruits are completely out until the post war period.

Only for the most essential military packaging are aluminum or lead foil allowed. Perhaps one of the most outstanding developments in wartime packaging is the flexible material made from lead foil, kraft paper, bond paper, asphaltic sealers, cellophane and thermoplastic adhesives which is now replacing all-metal cans for many military and lend-lease packages. This material worked into bags is used for bag-in-carton packs for 5 gal. of dehydrated vegetables, for waterproof match cases, for packets of sulfa drugs, for emergency rations on life boats, for plaster of paris bandages.

After the war, this material because of its weather-proof properties and light weight, will find many uses and have a place along with other metal foil packaging already so highly developed in the pre-war decade.

Foremost among the protective features of metal foil is its ability to exclude all light. This is particularly important for products subject to rancidity and spoilage. Such products as potato chips, for example, are especially sensitive to light. Only a few hours of exposure are sufficient to cause a photo-chemical reaction. Second important feature of the metal foil bag is its high resistance to moisture transmission. For these reasons, packers of dehydrated soups had much difficulty in obtaining a substitute when restrictions were placed on aluminum foil.

Metal foil is allowed only for military packaging of dehydrated foods and medical supplies. Here are examples of cartons in which are laminated bags of lead foil, kraft, bond paper, asphaltic sealers, cellophane and thermoplastic adhesives now replacing the all-metal can. Photo Reynolds Metals Co.



MUNSON
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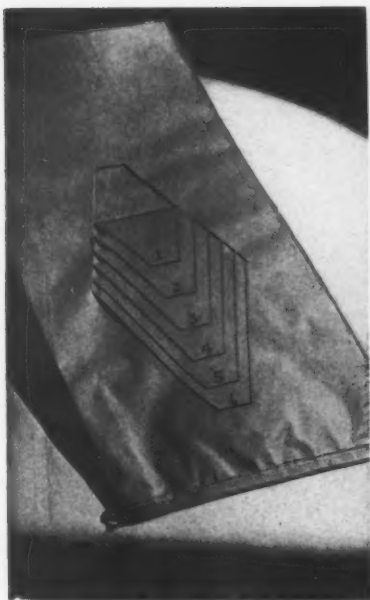
MADE OF

Cellophane

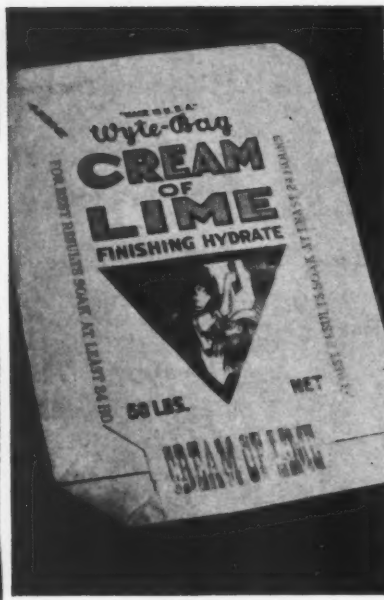
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Pasted valve bag



Sewn valve bag

Heavy Duty Multi-wall Paper Bags

by W. E. Scott

LAST year United States industry used more than one billion heavy-duty, multi-wall paper bags as bulk shipping containers for all types of commodities, ranging from comparatively inexpensive crushed and pulverized rock products to fine delicate, expensive foodstuffs needing the utmost in package protection. Shortage of burlap and tremendous export requirements have placed added demand on these "work horses" of packaging industry.

Shipping weights

The principal shipping weight in these bags is 100 lbs. of commodity, although many shippers are finding this type of container to be ideally suited, from both the economic as well as the utilitarian standpoint, for units ranging in weight from as low as 20 lbs. up to 140 lbs. Even 200 lb. bags for raw sugar have been successfully tested.

Construction of bags

Heavy duty multiwall paper bags are constructed of from three to six walls of kraft paper, depending upon the weight, density and physical characteristics of the product they are intended to carry. Each ply or wall of paper is properly arranged and fabricated in tubular form, one within the other, so that each bears its share of the burden. Greater flexibility and strength are obtained by using a multiple number of walls in relatively light basis weights rather than fewer walls of heavier paper. For this reason, the average heavy duty multiwall paper

bag is constructed of a number of sheets, ranging in basis weight from 40 to 70 lbs. each—the most frequently used paper being sheets in the 40- and 50-lb. basis weights.

Types of multiwall bags

There are two types of these containers in general use. These are the valve bag and the open-mouth bag. The valve bag is factory-closed. That is, it has been closed at both top and bottom at the point of manufacture. The closure is made by either pasting or sewing. A small opening called the "valve" is left at an upper corner and the bag is filled in the shipper's plant by means of special packing machines which force the material into the bag under pressure. When filled, the internal pressure of the commodity forces a flap of the bag material across the opening, thereby effecting closure, and the bag is ready for shipment.

The open-mouth bag is factory-closed at the bottom only; this closure is made by either pasting or sewing. The top of the bag is left open, ready to receive its contents at the filling station in the shipper's plant. The top closure, after filling, is generally effected by sewing, using machines especially designed for sewing paper bags, which closure is sift-proof. Where sifting is not a factor, then the closure may be made by tying the tops with either wire or twine. By reason of its large open mouth, which permits easy filling, this type of bag enjoys very wide use as a bulk shipping container for hundreds of commodities of practically all types and

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physical characteristics, since coarse and even non-free flowing materials are easily loaded into them.

Moisture protection

This is a major consideration where the bag is intended for certain hygroscopic products. Atmospheric moisture-vapor will penetrate the tightest sheet of untreated paper. To guard against this, one or more walls of several different moisture-resistant sheets are incorporated in the construction which results in a paper bag highly resistant to moisture penetration. Where direct protection against water is necessary, then a special water-repellent sheet is used as the outside wall, which will withstand heavy showers of long duration. Sometimes the sewn bottom seam of the bag is wax dipped for additional protection. These water repellent containers are an absolute necessity to meet the requirements of withstanding any climate of the earth for today's export shipments.

Bags of this type in cartons are being used for oils, inks and paints. With these types of liquids, however, different combinations of paper and adhesives are needed to provide the proper barriers.

The heavy duty multiwall paper bag is used ordinarily as a bulk shipping container for those commodities that are dry, powdered or granular in character and which

can be mechanically flowed or spout-poured into the bag. However, a few years ago witnessed the beginning of their use as bulk shipping containers for materials having post-hardening characteristics, such as rosin and certain asphalts which are poured into the bag in a liquid state at astonishingly high temperatures, without damage to the bag. When cooling and subsequent hardening takes place, the bag in effect is a tightly wrapped package. The advantage of this type of bag for these materials is at once self-evident. They are easier to handle than barrels, require less space to store a given amount of commodity and have a tare weight of 1 per cent as against a tare weight of over 20 per cent in the case of barrels and their initial cost is lower.

The use of new and improved packaging machinery has played no small part in the rapid development of these containers. Valve bags are packed on special types of automatic packers. Open-mouth bags are packed on machines which automatically weigh, fill, close and seal the material into the bags. There are also several machines that will perform any part of this packaging cycle. For instance, if the shipper already has weighing and filling equipment which he wishes to continue to use, then there is a packer available to complete the cycle that will automatically close and seal the bags.

Merchandise Envelopes and Packets

IN the bag man's vocabulary, a flat bag becomes an envelope when its ends are die-cut instead of serrated, to give shape to the flaps. Such containers are known as merchandise envelopes or packets. They protect the product and safeguard its identity; provide a convenient unit to dispense small quantities. Merchandise envelopes and packets are an aid in packaging such products as the following:

- 1) Individual portions of, e.g., powdered chocolate for hot drinks at soda fountains, soluble coffee, etc.
- 2) Small quantities of seeds, drug products, minute watch parts, phonograph needles, etc.
- 3) Small quantities of powdery substances, which must

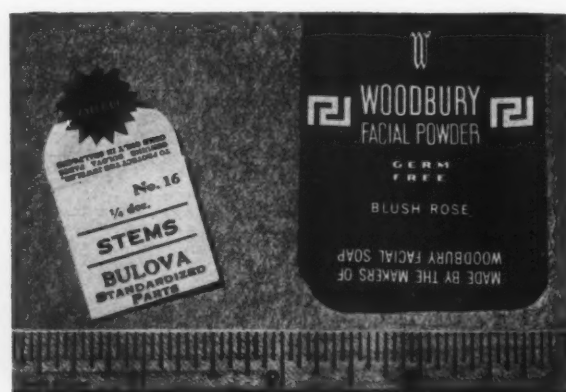
be completely enclosed to prevent sifting.

- 4) Flat objects of light weight, such as hosiery, gloves, collars, dress patterns, dress shields, notions, fishing flies, etc.
- 5) Samples distributed for promotional purposes.

In size they vary from tiny $\frac{1}{16}$ in. by 1 in. envelopes with a center seam, for minute watch parts, to $7\frac{1}{2}$ in. by $10\frac{1}{2}$ in. envelopes of general utility accommodating one or more pairs of hose, lingerie, etc.

Aside from their utilitarian function, many of these envelopes are used for their sales appeal. Therefore, they are made of all types of papers or cellophane, and may be printed in colors.

Left: Merchandise envelopes safeguard identity. Right: Miniatures for watch parts and face powders. Photos P. L. Andrews Corp.

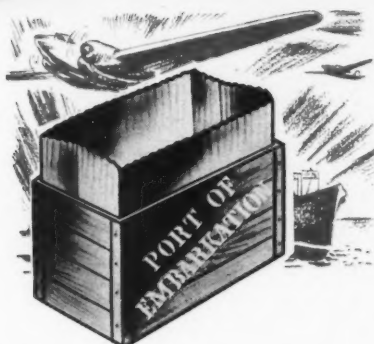


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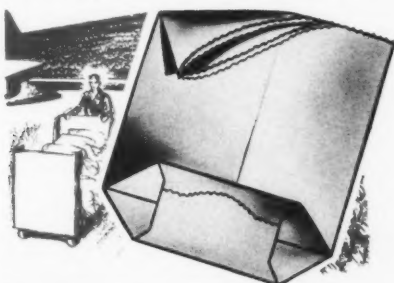
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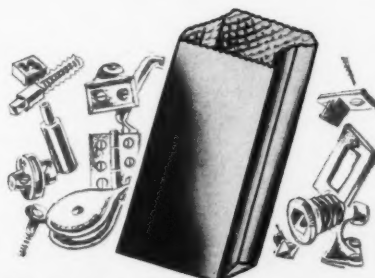
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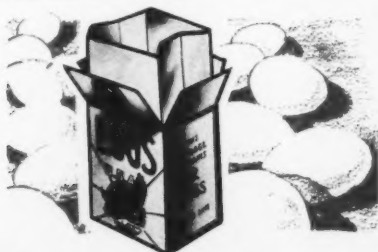
"PROTECTION-PLUS" AUTOMATIC BAGS — Multi-wall. To replace tin cans and other restricted containers. Full protection against moisture-vapor and grease. Sift-proof. For baking powders, dessert powders, food products, etc.



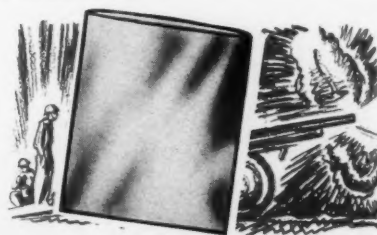
HEAVY-DUTY SHIPPING SACKS — Multi-wall (from 1 to 5 walls, in any combination of papers). Sift-proof, water or grease-proof, insect-proof, humidity-controlling. For fertilizers, chemicals, food stuffs, etc.



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Textile Bags

by Charles K. Everett

PRINCIPAL sources of materials for textile bags are jute and cotton. Jute is used for the making of burlap bags. Cotton bags are made of sheeting, osnaburgs, drills, print cloths, tobacco cloth and open mesh.

Jute comes from India. Therefore, the supply of that material for burlap bags is scarce and reserved for military use or essential products which cannot be packed satisfactorily in anything else.

Principal civilian uses for burlap bags in normal times are for the packing of potatoes, seeds, beans, fertilizer, meal, grain, sugar and other commodities in bulk. Burlap bags are made from many different weights and widths of material. The most common weights are 7½ oz., 8 oz., 10½ oz., and 12 oz., and the usual widths are 36 in. and 40 in. Special weight burlap has been made for extra strong bags. Burlap tubing has been designed as a protective wrapping for rectangular and cylindrical packages to avoid the hand sewing required for piece goods.

Dwindling supplies of jute for burlap have broadened the uses of cotton bags during the last year. To meet this unprecedented demand for cotton bagging fabrics, weavers and finishers have introduced a number of innovations. Cotton bags with grease-proof liners are now carrying pigments, putty, and sweeping compounds.

Cotton combined with one or more plies of paper and moisture-resistant adhesives have been adapted for the packaging in bags of cements, chemicals, food products, powdered soaps, and salts. These bags are sift-proof.

A few years ago the open mesh cotton bag made its debut. This bag was used primarily for the shipment of citrus fruits in small retail units. Since then, this specialty container has been adapted for the shipment of a constantly increasing number of fruits and vegetables, including grapefruit, cabbage, onions and potatoes. Nuts have been shipped in open mesh bags in both semi-bulk and small retail unit package sizes. Open mesh bags are available in both large bulk sizes and consumer sizes. Small sizes are available in colors.

By actual count there are more than 500 different kinds of cotton bags used for packaging, ranging in size from tiny tea bags to 200 lb. containers for flour and sugar.

As prospects stand now, it appears that more than twice as many cotton bags will be used in 1943 as in 1940. WPB Order L-99 directed the conversion of looms in the cotton-textile industry in adequate number to satisfy all approved needs for cotton bags for both new and established uses. Buttressing that action is Order M-107 which gives priority ratings on all bags required for all-important agricultural needs.

1. Burlap bag for seed, potatoes, beans, fertilizer, etc. 2. Cotton bag for packing items of heavy oil content. 3. Open mesh bag for vegetables. Photos, Bemis Bro. Bag Co. and Cotton Textile Institute.



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Bag Closing and Sealing Methods

by E. G. Kuhn

A BAG, like a bottle, has only one opening. If its walls are sufficiently strong for the intended purpose and its seams are sufficiently tight, it will afford adequate protection to the product, subject only to one consideration—namely, the effectiveness of its seal. If the seal is weak, it will not matter whether or not the bag was strong. If the seal is difficult to open, the consumer will find little satisfaction in the other good points of the bag. If the seal is difficult to re-close and the product is one which is not consumed in a single serving, consumer dissatisfaction can well be anticipated.

Because the bag closure is so vital to the proper functioning of the bag as a container, bag manufacturers, machinery manufacturers and packagers have worked hand in hand to develop closures which would solve the difficult problems confronting various packagers. Ingenious structures are today available providing closures fully adequate to meet virtually every problem. High-speed machinery is available to form and apply these bag closures.

Bag construction, materials and equipment will vary in almost every separate case which might be considered. It is, therefore, the purpose in the paragraphs which follow to present only a brief outline of some of the more widely used seals or closures employed on the modern retail or consumer sizes of bags.

It can be assumed in reference to each type of seal that maximum packaging economy, as well as standardized effect, is possible only through the use of the equipment which in almost every case has been developed concurrently with the introduction of the seal, or later as a means of adapting it to modern production requirements.

The Allison closure: Seals contents with a triple fold which is further reinforced by a strip of gummed tape. Folds are pressed firmly against contents while tape is rolled down bag sides. Good protection for product and easy stacking.

The Berner seal: Employs a tin tie strip which is attached in an exposed position to the bag top by a machine which completes the regular over and over fold operation and then folds in a metal tie giving re-sealing advantages.

The Delta seal: Folds bag top to produce oblique overimposed folds and in manner which when cut according to instruction produces a pouring spout for contents. The top of the bag when sealed presents a flat surface well adapted for stacking.

The Sealrite closure: A simple and extremely practical over and over fold which produces a compact, flat topped package with excellent merchandising appeal. Adaptable for intuck or gusseted bags of either paper, cellophane or foil, a tight, sift-proof closure is claimed.

The Seal-Tie closure: A modified use of the metal strip here preserves the re-sealing advantages, but confines the use of this feature to the secondary closing of the bag. The primary seal consists of an over and over fold securely pasted flat against top. A compact package with good display value.

The square top or flat closure: (Also known as the Hesser), uses a card which is placed inside the bag in most cases. The bag top is folded down and sealed by gluing with a top label (not gummed) glued on in addition. This type may be varied in at least two ways. For easy sifting products like sugar, the gluing is done in a different way and sometimes the top label is left off. Then the outer wrapper is die-cut, folded and glued top and bottom in a manner suggesting a band label which extends around the face of the bag.

The Tin Tie closure: Supplements standard bag construction with a paper covered strip of metal, which patented feature is licensed to various bag manufacturers on a royalty basis. Offers excellent re-sealing advantages at some sacrifice of absolute protection of contents. Wide variation of finished package effects obtainable. Automatic machines have now been developed for applying this closure.

The wire staple: An economical and, in certain instances, an entirely acceptable closure for both paper and cellophane bags. Classified as tamper-proof, although offering little resistance to moisture.

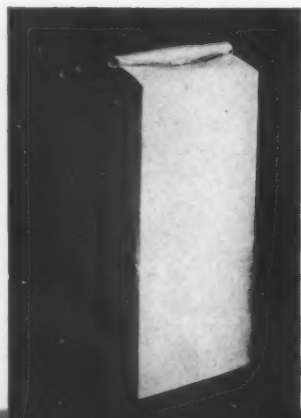
The Bagpak cushion stitch closure: Used only on paper bags, especially of the multiwall type. This requires a machine to apply and, in combination with a machine

Allison closure

Tin Tie closure

Deltaseal closure

Sealrite closure



if your containers must be
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PACKAGING CATALOG

159



Hesser closure foil



Square top or flat closure



Wire staple closure



Metal clip closure



Bagpak cushion stitch closure

sewed snake stitch, this closure is stronger than the walls of the bag.

Each type of seal illustrated and described has certain advantages which should be taken into careful consideration not so much on the basis of general merit, but rather from the standpoint of meeting the particular requirements presented by the product itself, the market it serves, competitive packaging and similar vital factors.

Alternate materials

Shortages of metal for ties and staples have brought about many ingenious developments of closures without metal. Several methods have been devised for using a heavy paper header which forms a closure the same as a metal one. This has been used successfully on coffee packages, as has another method of folding and crimping developed by A & P. There has also been progress in the development of weatherproof adhesives for seals and adhesives compounded from non critical materials.

Heat-sealing processes

The use of bags formed of transparent cellulose or acetate sheeting, rubber hydrochloride sheeting and similar heat-sealing films has brought about a rapid development of heat-sealing closures and methods of applying the same. The simplest of the heat-sealed bags is the pillow type formed from a tube of transparent sheet and crimped at either end between hot plates to achieve

Left. Square bag, filled and closed with automatic machine. Pasted closure. Right. Satchel bottom bag, closed by tying. Photos Courtesy The Consolidated Packaging Machinery Corp.



a seam. Transparent bags are also made in the flat, square and satchel bottom shapes and all may be heat-sealed for closure. Two general types of heat-sealing equipment are available. One locks the bag ends between heated jaws. The second heat-sealing unit passes the bag through one or more pairs of heated rollers.

Heat-sealing may also be applied to waxed papers, waxed paper bags, waxed glassine bags or bags treated with some type of thermoplastic adhesive.

Methods of bag closing

With the exception of the stapled bag—and this too may be closed by automatic instead of hand equipment—all of the closures shown require machine units for sealing. Such units for folding and sealing are usually integral with or included as a part of the weighing equipment customarily used.

In the closing of the larger size bags, there is a definite advantage, provided, of course, that production conditions are equal, in machine versus hand closing of bags. According to actual figures, obtained at one plant where both operations were used, the cost of machine sewing is approximately one-third that of hand sewing.

In general, the consideration of bag closures is of equal importance with that of the material from which the bags are made and their construction. It is essential, then, that manufacturers of bag closures and machines for forming them be freely consulted.

Comparative checking points

Bags sealed at the factory for today's export shipments must be judged by much more severe standards than would be applied to the ordinary bag used for domestic distribution or to the manufacturer-shipped bag carrying a single unit of merchandise. When powdered or granular material is bag packed or when essential weatherproof properties are required, the closure becomes the all-important point.

In considering closed bags of these types, the following may be taken as checking points: 1. Secure closure; 2. recloseability; 3. sift-proofness; 4. convenience in stacking; 5. convenience in packing; 6. cost and availability of necessary equipment.

Checking against these points, one type of closure may be indicated in one instance and another logically chosen for a different product and different marketing or manufacturing conditions

BOTTLES *and* JARS

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Glass Containers Standardized

by F. P. Gass

WARTIME restrictions have registered their effects on glass-packaging designs as on everything else. As long ago as April 1942, private molds were frozen, and new designs have appeared only upon appeal to the War Production Board with sufficient evidence to support the necessity for a new glass package. While permission for new glass packages was fairly liberal, particularly when needed for products converted from other packages, the multiplication of glass designs was effectively braked last year. By fall, glass containers for distilled spirits, wines, beer, preserves, jellies and paint, affecting about a third of the industry's expected output, had been standardized.

The re-issue of Order L-103 with revised text and an extended list of standards on April 5, 1943, was another great stride in standardization, and prescribed the specifications for at least another third of the industry's production. Here is a distinct break from the tradition, still strong among glass users, that the glass container should be molded to fit the product rather than that the product should be adapted to the container. For attached to the order are 15 drawings establishing specifications of 14 lines comprising approximately a hundred bottles and jars. The accompanying Schedule C, re-issued in amended form, listed the food products which must use these containers if packaged in glass and set the minimum capacity.

At almost the same time as Order L-103 was revised, Order M-104 was re-issued, indicating the volume of tinplate, terneplate and rubber that would be permitted for a long list of products, including foods, in the manufacture of closures. The two orders dove-tailed, and the glass containers, in effect, received official recognition as a wartime conservation package.

Purpose of the orders

The spirit of the order is not to standardize for the mere sake of regimentation. The purpose of WPB is to serve the war effort, and, so far as glass containers are concerned, this has meant taking adequate steps to ensure the maximum supply of containers from the glass plants of the country with the maximum use of available labor, mold equipment and forming machinery. The method has been to make one design do the work of many, wherever it is possible to do so. Conditions are thus framed to encourage longer production runs, simplify inventories and economize on labor and materials. It is estimated, for instance, that the standardization program will make possible an increase in production of between five and six million gross a year.

The difficulties in the way of sweeping glass container standardization are greater than commonly realized, especially when the criterion of can standardization is applied. Variations in the specific gravities of different products, even of different brands of the same product, mean a difference in the height of fill. These variations are of little consequence in a non-transparent container in which the headspace has the same diameter as the body. In bottles and jars, however, the headspace is roughly a truncated cone, and variations in the fill-point are advertised by the transparency of the container material. Two or three over-sizes have had to be provided for each of the most popular capacities, but even so, many products will doubtless have to change either their formula or the weight declared on their label in order to accommodate themselves to the standards.

For many products, standards have not yet been specified, but for most of these the effects and benefits of standardization have already been attained. Most household

Despite standardization of container sizes, any manufacturer may attain distinctive package and individual appearance by means of his label. This may vary in shape, size, design, color and position on the container.



and industrial chemicals, for instance, may be packaged in Boston Rounds or in glass jugs and jars which are already fairly uniform throughout the industry. Milk bottles, soft drink bottles and home-canning jars are lines which have always conformed closely to the requirements of the markets they serve, and little if anything would be gained by further standardization. Container designs for extracts, condiments and sauces have always been limited. For motor oil, once more back in glass, three designs have proved sufficient for the product and for the existing filling equipment. Drug products are a problem, since the required dosages necessitate a wide range of capacities, but here again the practice of the industry is already simplified.

Procedures of the day

The few remaining miscellaneous products must be content with "designs in existence" on May 11, 1942 (see text of Order L-103), or with the variants created by altering molds in existence on that date. Or they may find a more satisfactory package among the newly established standards. In cases of emergency, if a new design is required for a product which has never been in glass or for irreplaceable filling machinery, appeal may be made to Containers Division of WPB.

A word should be said about the new numbering system established by WPB to indicate standard exhibits. Every standard container has its individual number, each consisting of four digits separated by a dash into

pairs. The first pair indicates the line to which the bottle or jar belongs; thus, all jars in which the figure 10 constitutes the first pair of digits belong to the Plain Round Jar line in Exhibit Series 10-00. The second pair of digits indicates roughly the capacity, advancing one unit for every $\frac{1}{3}$ ounce for capacities from 1 to 16 ounces, one unit for every $\frac{2}{3}$ ounce for capacities from 16 to 32 ounces, and arbitrarily thereafter, for the comparatively few sizes above the quart.

The text of Order L-103 has been made flexible enough to permit the variations due to normal manufacturing practice in the industry. The specification tables set maximum weights for all containers, except beer bottles, but lower glass weights are allowable and, in fact, will be the rule for the bulk of glass container manufacture. Finishes are interchangeable if body molds do not have to be altered, providing the resulting overflow capacity is no less than that specified in the exhibit, and the requirement that the finish be a G.C.A. standard has been removed. A reasonable length of time has been permitted to wear out molds which approximate the standards.

The following pages illustrate the standard glass containers established by the amended Order L-103, issued April 5, 1943, and by the attached schedules. WPB may at any time issue other standards or "schedules establishing simplification practices of glass containers." But most of the program of standardization, though it may be modified in detail by amendment or appeal, has been accomplished and is outlined here.

Finishes for Glass Containers

by F. P. Gass

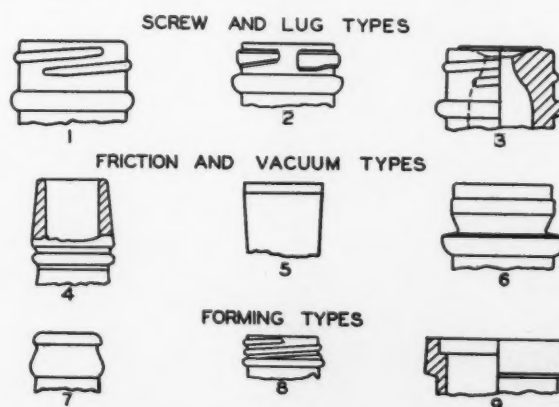
THE *finish* of a glass container is the region designed for the application of the closure. It is so called because in the old hand-blowing days it was the last part of the bottle to be shaped.

Since this finish is the bridge between the glass bottle industry and the closure industry, it is obviously essential that the dimensions of the finish be common property of both manufacturers. For this reason, the Glass Container Association has standardized every type of commercial finish for which closures are made, and the specifications of these finishes are available for the guidance of all producers of glass containers and closures.

These finishes may usually be applied to bottles of any design. So far as the prospective purchaser is concerned, all he has to do is to determine the type and size of bottle or jar he desires and the type and size of closure. When the shipments of glass containers and their closures arrive at the plant, the GCA standardization of finishes makes possible an accurate fit.

Approximately a hundred finishes have been standardized. These are designed for all commercial closures. In the following section describing the closure field, it

may be taken for granted that the proper finish is in the hands of the glass manufacturer.



Representative standard finishes for bottles of any design: 1. Shallow continuous thread. 2. Two lug Amerseal. 3. All glass sprinkler top. 4. Brandy cork. 5. Tumbler friction. 6. Deep friction "pry-off." 7. Crown. 8. Roll-on. 9. Band. Drawing Glass Container Assn.

WPB Glass Specifications

EXHIBIT SERIES 10-00

PLAIN ROUND JAR

Exhibit No.	Overflow capacity, ounces	Maximum weight, ounces	A	B, maximum	C	D	E	G.C.A. finish No.
10-14.....	4 1/4	3 3/4	3 25/64	2 1/64	2 1/64	1 49/64	1 49/64	48-400
10-20.....	6 1/4	4 3/4	3 35/64	2 19/64	3 1/8	2 1/16	1 31/32	53-400
10-26.....	8 3/8	6	4 9/32	2 37/64	1 11/16	2 9/64	1 31/32	53-400
10-27.....	8 3/8	6	4 9/32	2 35/64	1 11/16	2 1/8	2 1/8	58-400
10-28.....	8 3/4	6	4 11/32	2 17/32	3 5/8	2 11/64	2 1/8	58-400
10-36.....	11 1/2	7 1/8	4 25/32	2 29/32	4 9/64	2 7/16	2 1/8	58-400
10-39.....	12 1/2	7 1/2	4 27/32	2 29/32	4 9/64	2 1/2	1 31/32	53-400
10-40.....	12 1/2	7 1/2	4 27/32	2 27/32	4 9/64	2 1/2	2 1/8	58-400
10-48.....	15 1/2	8 1/2	5 1/8	3 1/16	1 15/16	2 11/16	2 3/8	63-400
10-51.....	16 1/2	9	5 7/32	3 11/64	2 7/32	2 47/64	2 3/8	63-400
10-52.....	17	9 1/4	5 11/32	3 1/16	2 7/32	2 55/64	2 3/8	63-400
10-53.....	18 9/16	9 1/2	5 3/8	3 9/32	2 9/32	2 49/64	2 3/8	63-400
10-60.....	22 3/4	11 1/2	5 7/8	3 1/2	1 15/16	3 11/64	2 3/8	63-400
10-63.....	24 1/2	11 3/4	5 61/64	3 39/64	3 1/32	3 7/32	2 3/8	63-400
10-67.....	27 1/2	13	6 1/4	3 47/64	1	3 25/64	2 3/8	63-400
10-72.....	31	13 3/4	6 9/16	3 47/64	1 1/32	3 49/64	2 3/8	63-400
10-75.....	32 3/8	14	6 3/4	3 37/64	1 1/16	3 49/64	2 3/8	63-400
10-77.....	34	14 1/2	6 15/16	3 31/32	1 3/32	3 49/64	2 3/8	63-400
10-81.....	48 3/4	20 1/2	7 11/16	4 29/64	1 1/4	4 17/64	2 3/8	70-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. Container shall be round.
5. Bottom stippling optional.

EXHIBIT SERIES 11-00

PLAIN ROUND QUART JAR

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B max.	C	D	E	G.C.A. finish No.
11-75.....	A	32 5/8	14	6 3/4	3 25/64	1 1/16	3 7/16	2 5/8	70-400
11-76.....	B	32 5/8	14 1/2	7 9/64	3 45/64	1 1/8	4 1/4	2 5/8	70-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. The profiles illustrated shall be maintained for the above exhibits.
4. Container shall be round.
5. Bottom stippling optional.

EXHIBIT SERIES 12-00

LARGE SIZE JAR

Exhibit No.	Size	Overflow capacity, oz.	Maximum weight, oz.	A	max. B	C	D	E	G.C.A. finish No.
12-86.....	1/2 gal....	65 1/4	28	8 5/8	4 29/32	1 3/8	4 1/2	3 1/8	83-400
12-91.....	No. 10....	105 9/16	37	9 29/32	6 1/64	1 1/4	4 1/2	3 1/8	83-400
12-96.....	1 gal....	130 1/2	46	10 1/16	6 31/64	1 3/4	5 5/16	3 1/8	89-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. Container shall be round.
5. Bottom stippling optional.

EXHIBIT SERIES 14-00

WIDE MOUTH JAR

Exhibit No.	Size	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	C	D	E	G.C.A. finish No.
14-85.....	5 lb....	58 1/2	24	8 7/32	4 13/16	1 1/16	4 1/4	2 5/8	G-450
14-87.....	1/2 gal....	66	26	8 23/32	5 1/64	1 1/4	4 1/4	2 5/8	G-450
14-90.....	No. 10....	103	35	10	5 57/64	1 1/2	4 1/2	2 5/8	G-450
14-92.....	10 lb....	116	41	10 9/16	6 5/32	1 1/2	5 1/8	2 5/8	G-450
14-96.....	1 gal....	132	44	10 5/8	6 11/32	1 3/4	5 1/8	2 5/8	G-450

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. Stippling may be substituted for fluting in the decorated areas shown at shoulder and heel. Containers shall be either fluted or stippled, never plain.
5. Container shall be round.
6. Bottom stippling optional.

EXHIBIT SERIES 15-00

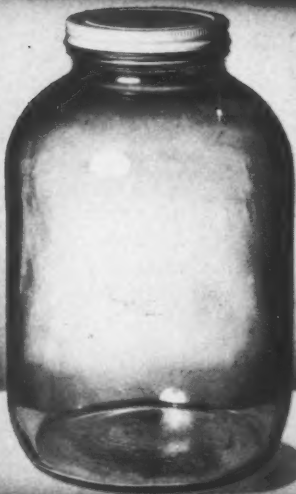
VEGETABLE AND FRUIT JAR

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	C	D	E	G.C.A. finish No.
15-50.....	A.....	17	7 1/2	4 11/16	3 15/64	3 3/32	3 5/16	2 1/2	66 mm.
15-51.....	B.....	17	8	4 11/16	3 5/16	1 11/16	2 15/16	2 17/32	66 mm.
15-52.....	C.....	17	8 1/2	5 19/64	3 7/64	3 1/4	3	2 17/32	66 mm.
15-58.....	A.....	28 3/8	12	4 7/8	4 5/64	3 3/32	3 11/32	3 3/32	83 mm.
15-59.....	B.....	28 3/8	13	4 7/8	4 5/32	3 1/4	2 15/16	3 1/8	83 mm.
15-70.....	C.....	28 3/8	13 1/2	6 11/32	3 41/64	3 7/64	2 29/32	3 1/8	83 mm.

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to those illustrated shall be maintained for the above exhibits consistent with the "C", "F" and "D" dimensions.
4. Style "C" shall be straight sided only. Styles "A" and "B" may be straight sided or with 25/32" minimum and 1 1/16" maximum for the "F" dimension. The label space may be indented or tapered as shown.
5. Shoulder and heel stippling as indicated is optional.
6. Container shall be round.
7. Bottom stippling optional.



Above: Series 10-00 Plain Round Jar
Below: Series 12-00 Large Size Jar



Above: Series 15-00 Vegetable & Fruit Jar (17 oz.)
Below: Series 15-00 Vegetable & Fruit Jar (28 3/8 oz.)





Duraglas

CONTAINERS



METAL AND PLASTIC
CLOSURES



METAL
CONTAINERS



LIBBEY SAFEDGE
GLASSES



OWENS-ILLINOIS

OWENS-ILLINOIS GLASS COMPANY

OWENS-ILLINOIS CAN COMPANY

OWENS-ILLINOIS PACIFIC COAST COMPANY

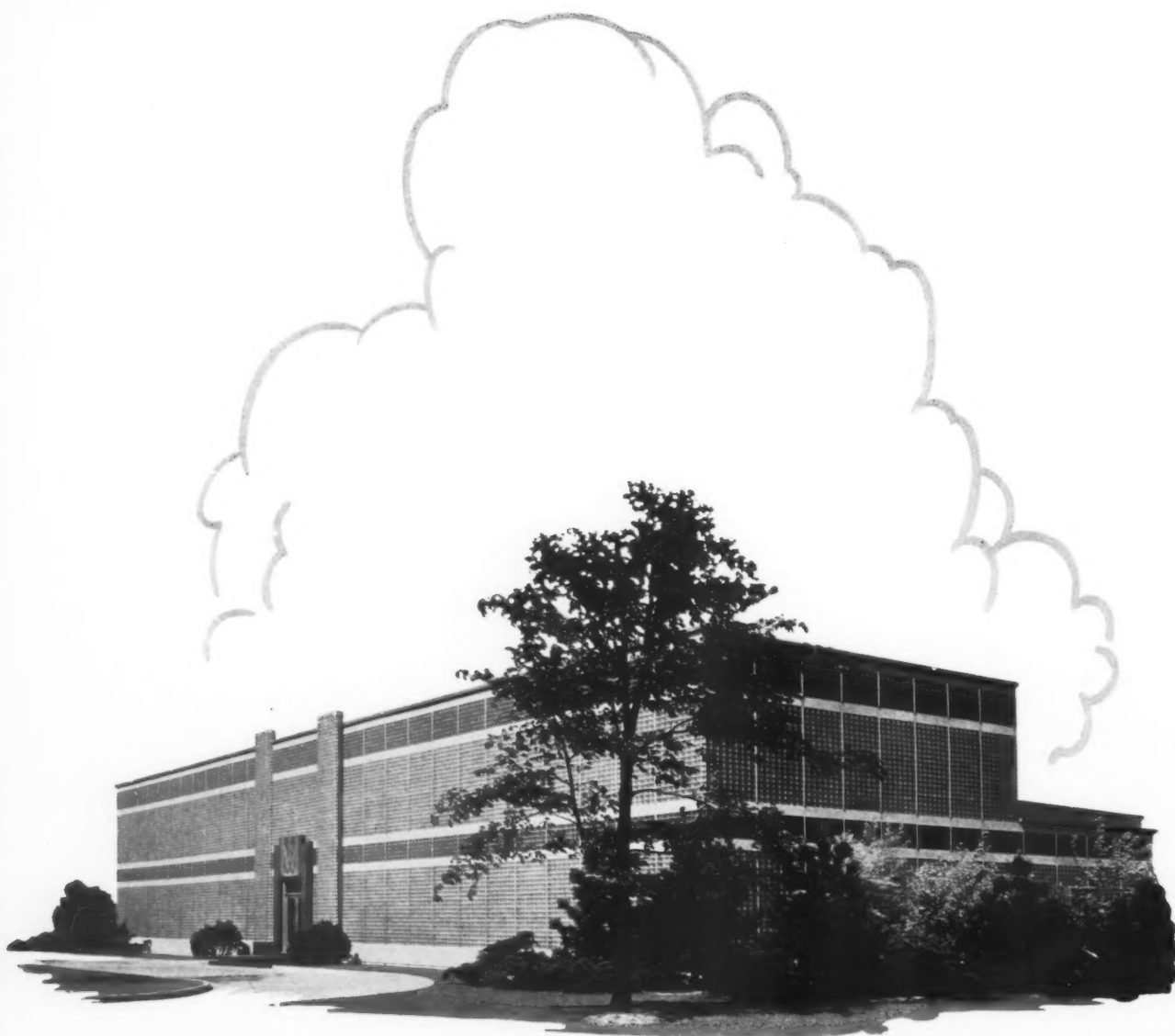
CLOSURES



Duraglas



OWENS



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OWENS-ILLINOIS
TOLEDO

25 1/2 OZ. JUICE JAR

EXHIBIT SERIES 16-00

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	F	D	E	G.C.A. finish No.
16-64.....	A.....	25 1/2	11	5 7/16	3 3/4	27/32	3 15/32	2 1/2	66-mm.
16-65.....	B.....	25 1/2	11 7/8	5 19/64	3 15/64	28/32	3 5/64	2 5/8	66-mm.

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. The profiles illustrated shall be maintained for the above exhibits. A label recess must be maintained.
4. Shoulder and heel of jar shall be stippled as indicated.
5. Container shall be round.
6. Bottom stippling optional.

49 OZ. JUICE JAR

EXHIBIT SERIES 16-00

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	F	D	E	G.C.A. finish No.
16-80.....	A.....	49	20	7 13/32	4 13/32	1 1/2	4 15/32	2 1/2	66-mm.
16-81.....	B.....	49	20	7 13/32	4 1/2	1 1/16	4 3/32	2 5/8	66-mm.

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. The profiles illustrated shall be maintained for the above exhibits. A label recess must be maintained.
4. Shoulder and heel of jar shall be stippled as indicated.
5. Container shall be round.
6. Bottom stippling optional.

OLIVE BOTTLE

EXHIBIT SERIES 17-00

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	C	D	E	G.C.A. finish No.
17-22.....	A.....	6 11/16	6 5/8	4 49/64	2 5/64	9/32	3 31/32	1 15/16	53-400
17-26.....	A.....	8 1/4	8 1/16	5 11/64	2 1/4	9/32	4 7/32	2 1/4	58-400
17-38.....	A.....	12 1/8	10	6 1/64	2 17/32	5/16	4 31/32	2 1/4	58-400
17-50.....	A.....	16 1/8	11 1/4	6 41/64	2 23/32	11/32	5 7/32	2 3/4	63-400
17-56.....	A.....	20 1/8	14 1/2	7 1/8	2 15/16	5/8	5 1/2	2 3/4	63-400
17-76.....	A.....	32 5/8	14 3/4	7 27/32	3 13/32	7/16	5 7/8	2 3/4	63-400
17-09.....	B.....	2 1/2	3 3/4	3 7/8	1 19/32	3/16	2 23/32	1 3/8	38-440
17-11.....	B.....	3 1/2	4 3/8	5 1/64	1 9/16	3/16	3 59/64	1 3/8	38-400
17-17.....	B.....	5 3/8	5 3/4	5 15/16	1 3/4	7/32	4 31/64	1 17/32	43-400
17-23.....	B.....	7 7/16	7 5/8	6 13/32	1 57/64	1/4	5 25/64	1 5/8	48-400
17-33.....	B.....	10 1/4	10 1/4	7 7/16	2 1/8	9/32	6 11/64	1 15/16	53-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to those illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. Container shall be round.
5. Bottom stippling optional.

CHERRY BOTTLE

EXHIBIT SERIES 18-00

Exhibit No.	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	B ₁ , max.	E	G.C.A. finish No.
18-08.....	2 11/16	4 1/8	4 9/16	1 45/64	1 25/64	1 3/8	38-400
18-14.....	4 7/16	5 1/8	5 29/64	1 43/64	1 1/2	1 3/8	38-400
18-22.....	7	6 3/4	6	2 25/64	1 7/4	1 17/32	43-400
18-42.....	13 1/2	13 1/2	8 7/64	2 11/16	2 1/5	1 15/16	53-400
18-62.....	24 1/4	20 3/2	10 1/16	3 9/32	2 29/64	1 15/16	53-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" and "B₁" dimensions.
3. Profiles similar to that illustrated shall be maintained for the above exhibits.
4. Container shall be round.
5. Bottom stippling optional.

SHORTENING JAR

EXHIBIT SERIES 19-00

Exhibit No.	Style	Overflow capacity, oz.	Maximum weight, oz.	A	B, maximum	F	D	E	Finish size
19-57.....	A.....	20	10	4 1/4	3 39/64	1 1/2	1 13/16	3 1/8	83-400
19-85.....	A.....	58 7/16	24	6	5 5/4	1	2 5/16	3 1/8	83-400
19-58.....	B.....	20	11 1/2	4 1/4	3 39/64	1 3/8	2 1/2	3 3/8	89-400
19-86.....	B.....	58 7/16	24	6	5 29/64	1 3/16	3	3 3/8	89-400

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "F" and "D" dimensions. A label recess must be maintained.
4. Shoulder and heel of jar shall be stippled as indicated.
5. Container shall be round.
6. Bottom stippling optional.



Above: Series 16-00 Juice Jar

Below: Series 17-00 Olive Bottles



Above: Series 18-00 Cherry Bottles

Below: Series 19-00 Shortening Jar





Above: Series 20-00 - Tumblers

Below: Series 50-00 - Stubby Round Bottle



Above: Series 51-00 - Glass Jug

Below: Series 53-00 - Catsup Bottle



TUMBLERS

EXHIBIT SERIES 20-00

Exhibit No.	Overflow capacity, oz.	Capacity overflow, plus or minus, oz.	G.C.A. finish No. min.
20-13	3 3/4 to 4 1/4	1/4	58 mm.
20-16	4 3/4 to 5 1/4	1/4	63 mm.
20-19	5 3/4 to 6 1/4	1/4	63 mm.
20-20	6 1/4 to 6 3/4	1/4	63 mm.
20-23	7 to 7 1/2	1/4	68 mm.
20-26	8 to 8 1/2	1/4	68 mm.
20-30	9 1/4 to 9 3/4	1/2	68 mm.
20-32	9 3/4 to 10 1/4	3/4	73 mm.
20-39	11 3/4 to 12 3/4	3/4	73 mm.
20-44	13 3/4 to 14 1/4	3/4	80 mm.

1. Container shall be round.
2. Bottom stippling optional.

STUBBY ROUND BOTTLE

EXHIBIT SERIES 50-00

Exhibit No.	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	F	D	E	Finish size
50-08	2 1/4	3	3 19/32	1 17/64	3/8	2 5/32	1 11/16	20-400
50-14	4 1/4	4 1/4	4 5/16	1 7/8	7/16	2 9/16	1	26-2410
50-21	6 19/32	5 1/2	4 15/16	2 5/32	1 1/2	2 27/32	1	26-2410
50-28	8 3/4	6 1/2	5 9/32	2 13/32	1 7/8	3 1/16	1	26-2410
50-40	12 3/4	8 1/2	6 5/16	2 11/16	2 1/8	3 1/2	1	26-2410
50-51	16 7/8	10 3/4	6 11/16	2 9/16	2 1/2	3 7/8	1	26-2410
50-52	17 3/4	10 3/4	6 11/16	2 9/16	2 1/2	3 7/8	1	26-2410
50-64	25 3/4	14	7 11/16	3 11/32	3 1/2	4 7/16	1	26-2410
50-76	33 7/16	17	8 5/8	3 39/64	3 3/4	5 1/8	1	26-2410
50-77	34	17	8 5/8	3 31/32	3 3/4	5 1/8	1	26-2410
50-81	48 1/2	23	8 29/32	4 11/64	4 1/2	5 5/8	1 1/16	26-2410
50-85	58 1/8	25 1/2	9 1/8	4 17/32	5 1/2	5 5/8	1 7/16	36-700
50-91	105 3/8	37	9 15/32	6 5/64	7 1/16	4 3/4	1 7/16	36-700

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "F" and "D" dimensions. A label recess must be maintained.
4. Bottles shall be fluted as shown.
5. Container shall be round.
6. Bottom stippling optional.

GLASS JUG

EXHIBIT SERIES 51-00

Exhibit No.	Size	Overflow capacity, oz.	Maximum weight, oz.	A	B, max.	C	D	G.C.A. finish No.
51-86	Half gallon	66	31	8	4 11/32	1 17/64	4 9/32	38-400
51-87	Half gallon	66	31	8	4 11/32	1 17/64	4 9/32	70-450
51-88	Half gallon	67	31	8	5	1 17/64	4 9/32	38-400
51-89	Half gallon	67	31	8	5	1 17/64	4 9/32	70-450
51-92	Gallon	130	46	9 3/8	6 39/64	1 11/16	4 1/2	38-400
51-93	Gallon	130	46	9 3/8	6 39/64	1 11/16	4 1/2	70-450
51-94	Gallon	131 1/2	46	9 3/8	6 1/2	1 11/16	4 1/2	38-400
51-95	Gallon	131 1/2	46	9 3/8	6 1/2	1 11/16	4 1/2	70-450
51-96	Gallon	134 1/2	48	9 3/8	6 19/32	1 11/16	4 1/2	38-400
51-97	Gallon	134 1/2	48	9 3/8	6 19/32	1 11/16	4 1/2	70-450
51-98	Gallon	136	48	9 3/8	6 41/64	1 11/16	4 1/2	38-400
51-99	Gallon	136	48	9 3/8	6 41/64	1 11/16	4 1/2	70-450

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. Profiles similar to that illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. Container shall be round.
5. Bottom stippling optional.

CHILI SAUCE BOTTLE

EXHIBIT SERIES 52-00

Exhibit No.	Capacity to F. P., oz.	Maximum weight, oz.	FP	A	B, max.	F	D	E	G.C.A. finish No.
52-33	10 1/4	9 1/4	6 1/16	6 1/16	2 29/64	3/4	3 21/32	1 7/16	36-250

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the "B" dimension.
3. The profile illustrated shall be maintained for the above exhibit. A label recess must be maintained.
4. Container shall be round.
5. Bottom stippling optional.

EXHIBIT SERIES 53-00

CATSUP BOTTLE

Exhibit No.	Style	Capacity to F. P., oz.	Maximum weight, oz.	FP up	A	C			D			E	G.C.A. finish No.
						No. of panels							
						8	16	20	8	16	20		
53-38	Stubby...	12 ¹ / ₂	8 ³ / ₄	5 ¹⁵ / ₁₆	5 ¹⁵ / ₁₆			⁵ / ₈			2 ¹¹ / ₁₆	1 ¹ / ₁₆	26-250
53-39	A	12 ¹ / ₄	10 ¹ / ₂	7 ³ / ₈	7 ³ / ₈	⁹ / ₁₆	¹ / ₂		3 ⁷ / ₁₆	3 ⁷ / ₁₆		1 ¹ / ₁₆	26-250
53-40	B	12 ¹ / ₄	10 ¹ / ₂	7 ³ / ₈	7 ³ / ₈	⁹ / ₁₆	¹ / ₂		3 ⁷ / ₁₆	3 ⁷ / ₁₆		1 ¹ / ₁₆	31-250

1. Finishes are interchangeable in accordance with provisions of the order.
2. When lower glass weights are used, adjustment to make correct capacity shall be made in the body diameters.
3. Profiles similar to those illustrated shall be maintained for the above exhibits consistent with the "C" and "D" dimensions.
4. The stubby style is made with 20 panels only. Styles "A" and "B" may be made with either 8 or 16 panels.
5. Container shall be round.
6. Bottom stippling optional.

Containers For Distilled Spirits

(Schedule A)

EXHIBIT A-1-a

Distilled Spirits Bottle, 32 ounce capacity
Bottles shall be plain and without decoration except for capacity designation, Federal indicia, glass maker's identification. No label spotting design features allowed.
Bottles must be round—19 oz. wt.

EXHIBIT A-2-a

Distilled Spirits Bottle, 25.6 ounce capacity
Bottles shall be plain and without decoration except for capacity designation, Federal indicia, glass maker's identification. No label spotting design features allowed.
Bottle must be round—17 oz. wt.

EXHIBIT A-3-a

Distilled Spirits Flask, 16 ounce capacity
Any interchangeable finish may be used.
Bottles shall be plain and without decoration except for capacity designation, Federal indicia, glass maker's identification. No label spotting design features allowed.
Bottle wt.—13½ oz.

EXHIBIT A-4-a

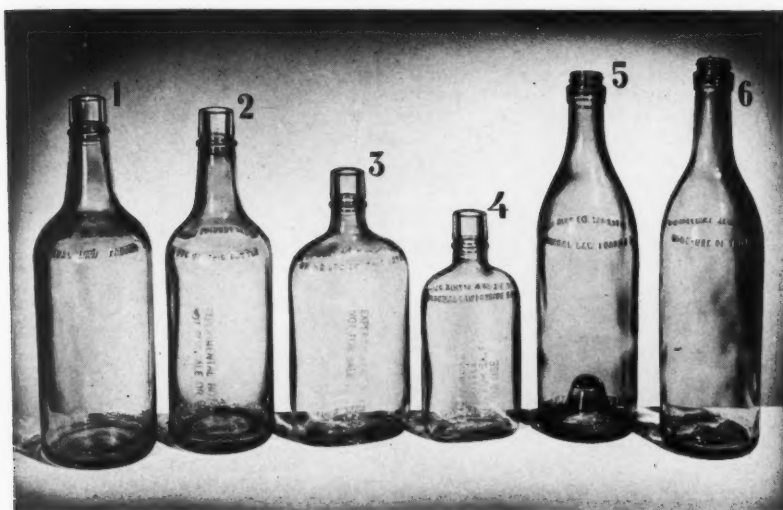
Distilled Spirits Flask, 8 ounce capacity
Bottles shall be plain and without decoration except for capacity designation, Federal indicia, glass maker's identification. No label spotting design features allowed.
Bottle wt.—8½ oz.

EXHIBIT A-5

Distilled Spirits Bottle, 25.6 ounce capacity—Rum
Bottle must be round—20 oz. wt.
Bottles shall be plain and without decoration except for cap. lett., Federal indicia, glass maker's identification. No label spotting design features allowed.

EXHIBIT A-6

Distilled Spirits Bottle, 25.6 ounce capacity—Brandy
Bottles must be round—19 oz. wt.
Bottles shall be plain and without decoration except for cap. lett., Federal indicia, glass maker's identification. No label spotting design features allowed.



Containers for Distilled Spirits

1. 32-oz. capacity bottle.
2. 25.6-oz. capacity bottle.
3. 16-oz. capacity flask.
4. 8-oz. capacity flask.
5. 25.6-oz. capacity rum bottle.
6. 25.6-oz. capacity brandy bottle.

Containers for Malt Beverages

(Schedule B)

EXHIBIT B-1

Steinie Shape Beer Bottle for Unpasteurized Beer
64 ounce capacity, 66½ overflow.
Bottles must be round—34 oz. wt.

EXHIBIT B-2

Steinie Shape Beer Bottle for Pasteurized Beer,
64 ounce capacity, 68 overflow.
Bottles must be round—39 oz. wt.

EXHIBIT B-3-a

Steinie Shape Beer Bottle, 32 ounce capacity,
33¾ overflow.
Any interchangeable finish may be used.
Optional weights 20 and 24 oz.—adjust diameter to make capacity.
Bottles must be round.

EXHIBIT B-4

Steinie Shape Beer Bottle, 12 ounce capacity,
12¾ overflow.
Bottles must be round—9¾ oz. wt.

EXHIBIT B-5-a

Export Shape Beer Bottle, 32 ounce capacity,
33¾ overflow.
Bottles must be round—28 oz. wt.
Any interchangeable finish may be used.

EXHIBIT B-6

Export Shape Beer Bottle, 12 ounce capacity,
12¾ overflow.
Bottles must be round—12 oz. wt.

EXHIBIT B-7

Select Shape Beer Bottle for Pasteurized Beer,
64 ounce capacity, 68 overflow.
Bottles must be round—39 oz. wt.

EXHIBIT B-8

Select Shape Beer Bottle for Unpasteurized Beer,
64 ounce capacity, 66½ overflow.
Bottles must be round—36 oz. wt.

EXHIBIT B-9

Select Shape Beer Bottle, 12 ounce capacity,
12¾ overflow.
Bottles must be round—12 oz. wt.

EXHIBIT 10-A

Ale Bottle, 32 ounce capacity, 33¾ overflow.
Bottles must be round—28 oz. wt.

EXHIBIT B-11

Ale Bottle, 12 ounce capacity, 12¾ overflow.
Bottles must be round—12 oz. wt.

EXHIBIT B-12

Single Trip Beer Bottle, 12 ounce capacity,
12¾ overflow.
The bottle shall be round with stippling and lettering as shown—8 oz. max. weight.

EXHIBIT B-13

Single Trip Beer Bottle, 32 ounce capacity,
33¾ overflow.
The bottle shall be round with stippling and lettering as shown—18 oz. max. weight.

Attention is called to this important provision in the order: "On and after April 15, 1943, the standard glass containers described in Exhibits 12 and 13 shall be manufactured only for malt beverages to be shipped outside of the forty-eight states of the United States of America and the District of Columbia."

Glass goes To work for America

PACKING IN GLASS
MAKES SENSE! IT'S
PLENTIFUL!

HELPS SELL YOUR
PRODUCT - HAS
REAL EYE-APPEAL!



HELPS CONSERVE
TONS OF STEEL, TIN
AND TINPLATE,
TOO!



CONSUMERS LIKE
IT. SIMPLIFIES SERV-
ING, PORTIONING.
QUANTITY CAN BE SEEN
AT ALL TIMES!

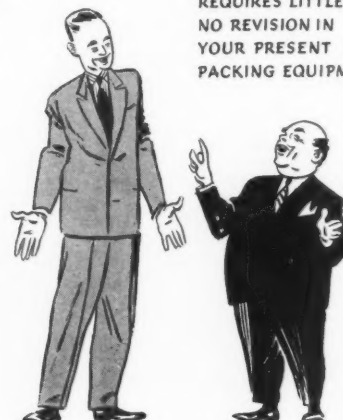


RIGHT! AND
ANCHOR HOOKING
CAN GIVE EXPE-
RIENCED
HELP!



EASY TO HANDLE ON
THE PRODUCTION LINE!

CHANGE-OVER OFTEN
REQUIRES LITTLE OR
NO REVISION IN
YOUR PRESENT
PACKING EQUIPMENT!



Anchor Hocking's Packers!

Let us show you how your products will look in GLASS!

Simply send us two samples of your products, and without cost or obligation, we will repack and return them in suitable glass packages, together with all the information you'll need for serious consideration of the glass package.

★ ★ ★

Packers and manufacturers of the products illustrated have recently switched to Anchor Hocking containers and closures and by so doing are helping the Government to conserve critical steel, tin and tinplate. At the same time they are giving their customers a more practical and a more convenient package.

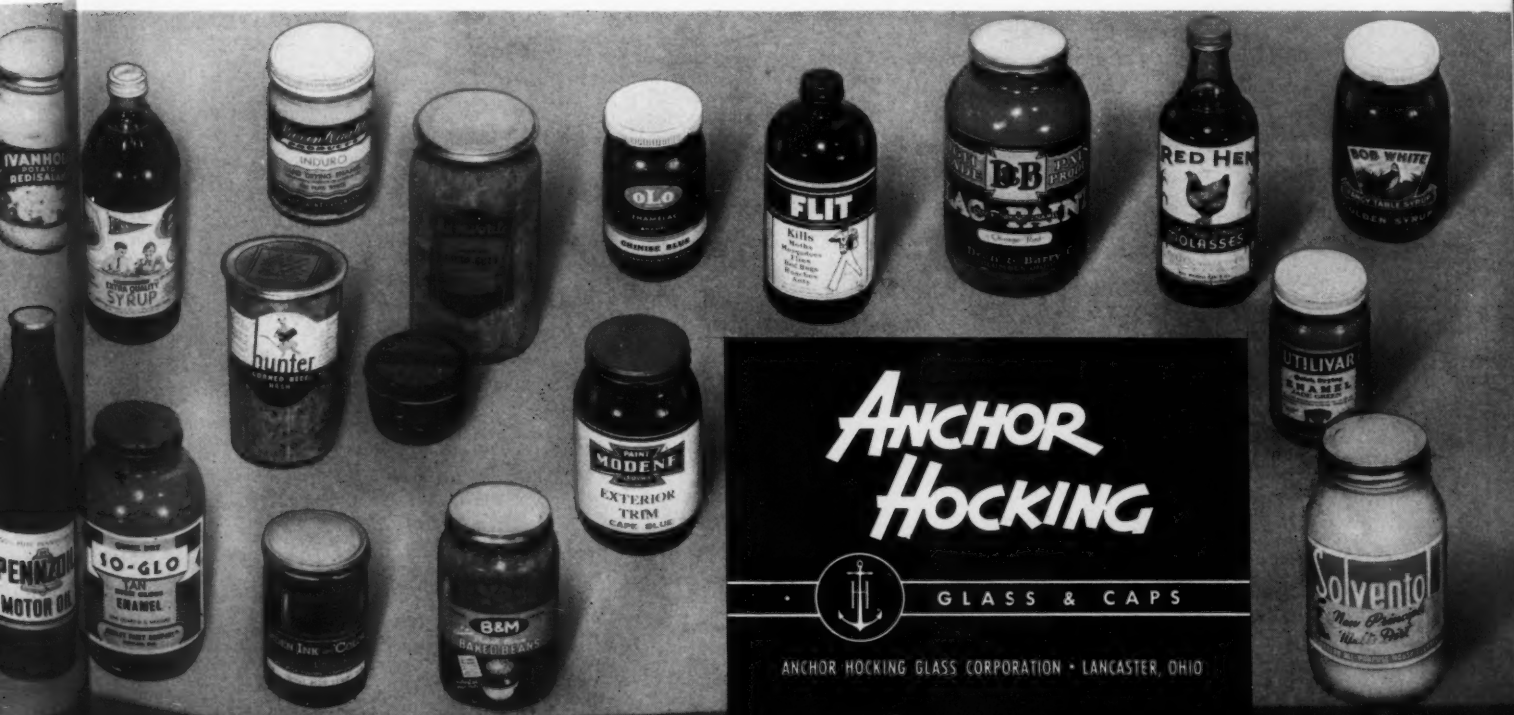
WHEN YOU SEAL IT—BE SURE!

One of your most vital problems is the preservation of your glass-packed products' original qualities between plant and consumer. That's why, when you seal it—be sure! Use a closure of unquestioned efficiency—an Anchor Closure.

Whether your product is packed hot or cold, with or without vacuum, sterilized or processed, you will find in the Anchor Hocking family a clo-

sure that will not only insure the delivery of your product with all its qualities intact, but which will also permit easy access to it.

Remember—all Anchor Closures are carefully designed, skillfully engineered. They apply easily and quickly...some by hand, others by sealing machines ranging all the way from the simple foot type to those which are completely automatic.



ANCHOR HOCKING



GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION • LANCASTER, OHIO



Containers for Malt Beverages (Continued)

1. 12 oz. Steinie shape beer bottle. 2. 12 oz. export shape beer bottle. 3. 12 oz. select shape beer bottle. 4. 12 oz. ale bottle. 5. 32 oz. ale bottle. 6. 64 oz. Steinie (unpasteurized). 7. 64 oz. select shape for pasteurized beer. 8. 32 oz. export shape. 9. 32 oz. Steinie shape. 10. 32 oz. single trip beer bottle. 11. 12 oz. single trip beer bottle.

Containers for Certain Food Products (Schedule C)

In order to restrict use of glass containers to the standardized type Schedule C provides that no person shall pack any product on the accompanying list in any but standard glass containers as defined in L-103, and the minimum sizes to be packed are as shown in the right hand column.

I. Product	II. Minimum Overflow capacity in fluid ounces
1. Fruit butter.....	12
2. Preserves.....	12
3. Jelly.....	9
4. Salad dressings (including products using salad dressing as a base).....	8
5. Olive oil.....	2
6. Edible oils (other than olive oil).....	16
7. Shortenings.....	20
8. Maple syrup.....	12

I. Product	II. Minimum Overflow capacity in fluid ounces
9. Syrups (except chocolate and maple), including blended, bottlers, cane, corn, molasses, sorghum, malt and fountain syrups.....	16
10. Chocolate syrup.....	8
11. Tomato catsup.....	12
12. Chili sauce and cocktail sauce.....	10
13. Tomato paste Not less than 25% by weight dry tomato solids.....	6
14. Tomato pulp and puree Not less than 10.7% (specific gravity 1.045) or more than 25% by weight dry tomato solids.....	12
15. Vinegar.....	16

I. Product	II. Minimum Overflow capacity in fluid ounces
16. Fruits and vegetables and mixtures thereof, including ripe olives, but excluding cranberries and maraschino cherries.....	16
17. Honey.....	6
18. Pickles and relishes.....	8
19. Peanut butter.....	8
20. Fruit and vegetable juices and mixtures thereof.....	12
21. Olives, green.....	3
22. Maraschino cherries.....	4
23. Cranberries and cranberry sauce.....	8
24. Pectin, liquid.....	8

Containers for Wines (Schedule D)

EXHIBIT D-1-a

Wine Bottle—12 oz. capacity, bulb neck, flat bottom.

Any interchangeable finish may be used.
Bottles must be round, 11 oz. max. wt.

EXHIBIT D-2-a

Wine Bottle—23.6 oz. capacity, bulb neck, flat bottom.

Any interchangeable finish may be used.
Bottles must be round, 19 oz. max. wt.

EXHIBIT D-3

Wine Bottle—23.6 ounce capacity, straight neck pushup bottom.

Any interchangeable finish may be used.
Bottles must be round, 21 oz. max. wt.

EXHIBIT D-4

Champagne Bottle, 13 ounce capacity.

Any interchangeable finish may be used.
Bottles must be round, 20 oz. max. wt.

EXHIBIT D-5

Champagne Bottle, 26 ounce capacity.

Any interchangeable finish may be used.
Bottles must be round, 37 oz. max. wt.

EXHIBIT D-6

Wine Bottle, 64 ounce capacity.

Any interchangeable finish may be used.
Bottles must be round, 31 oz. max. wt.

EXHIBIT D-7

Wine Bottle, 128 ounce capacity.

Any interchangeable finish may be used.
Bottles must be round, 46 oz. max. wt.

EXHIBIT D-8-a

Wine Bottle—32 oz. capacity, bulb neck, flat bottom.

Any interchangeable finish may be used.
Bottles must be round, 20 oz. max. wt.

EXHIBIT D-9-a

Wine Bottles—16 oz. capacity.

Any interchangeable finish may be used.
Bottle wt. 13 1/2 oz. max.

KIMBLE'S NEUTRAGLAS (N-51A GLASS)

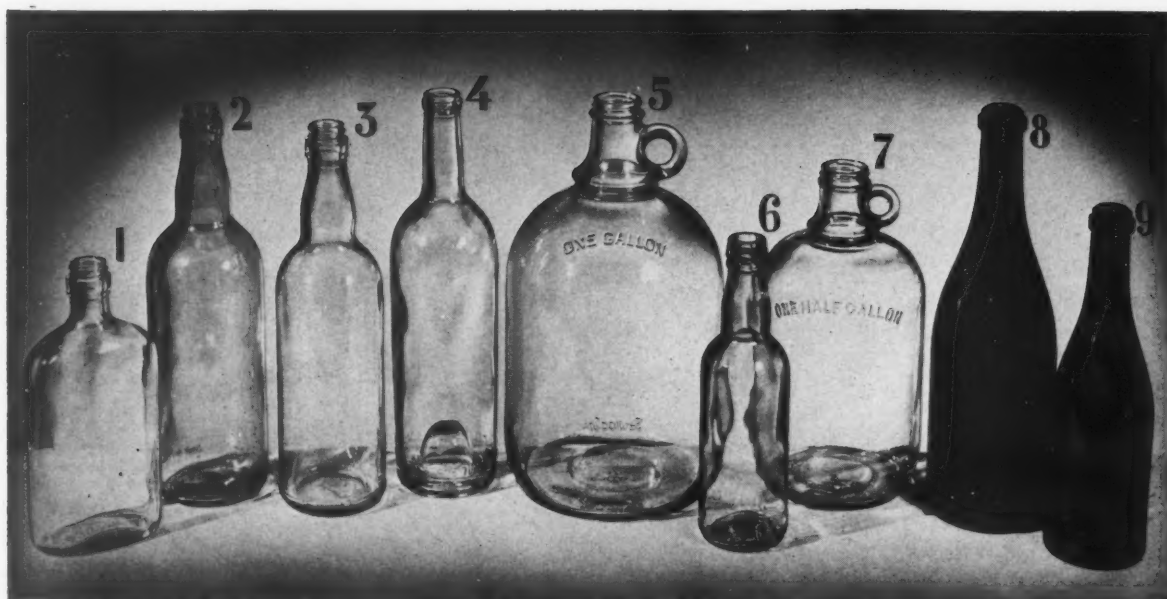
The Line of MOST Resistance

Clinical SERUM BOTTLES AND MOLDED GLASS CONTAINERS

KIMBLE NEUTRAGLAS—especially designed for maximum safety in packaging pharmaceuticals and biologicals—offers the highest resistance to chemical attack and solvent action.

Protect the quality, potency and pH value of your products by standardizing NOW on Kimble Ampuls, Serum Vials, Serum Bottles and Clinical Glass containers made of NEUTRAGLAS (N-51A Glass)—CLINICALLY SAFE.

• • • The Visible Guarantee of Invisible Quality • • •



Containers for Wines (Continued)

1. 16 oz. wine bottle, flask shape. 2. 32 oz. round wine bottle, bulb neck, flat bottom. 3. 25.6 oz. wine bottle, bulb neck, flat bottom. 4. 25.6 oz. wine bottle, straight neck, pushup bottom. 5. 128 oz. wine jug. 6. 12.8 oz. wine bottle, bulb neck, flat bottom. 7. 64 oz. wine jug. 8. 26 oz. champagne bottle, pushup bottom. 9. 13 oz. champagne bottle, pushup bottom.

Containers for Paint (Schedule E)

EXHIBIT 1

Paint Container
Overflow capacity— $8\frac{1}{4}$ oz.—Glass weight 6 oz.

EXHIBIT 2

Paint Container
Overflow capacity—17 oz.—Glass weight $9\frac{1}{4}$ oz.

EXHIBIT 3

Paint Container
Overflow capacity—34 oz.—Glass weight $14\frac{1}{2}$ oz.

EXHIBIT 4

N. M. Round Container
Capacity—8 oz.—Glass weight $\frac{3}{4}$ oz.

EXHIBIT 5

N. M. Round Container
Capacity—16 oz.—Glass weight $9\frac{13}{16}$ oz.

EXHIBIT 6

N. M. Round Container
Capacity—32 oz.—Glass weight $16\frac{1}{8}$ oz.

EXHIBIT 7

N. M. Round Container
Capacity—64 oz.—Glass weight 30 oz.

EXHIBIT 8

N. M. Round Container
Capacity—128 oz.—Glass weight 30 oz.

EXHIBIT 9

Paint Container
Overflow capacity—136 oz.—Glass weight 49 oz.



Attention is called to this important provision in the order: "No person shall use any standard glass containers with a finish larger than 38 mm. for the packing, for sale or for sample purposes, of shellacs and clear varnishes, and jobbing items (including but not limited to linseed oil, turpentine, benzine, mineral spirits, lacquer thinners, varnish and paint removers, and driers)."

Left: 136 oz. capacity paint container. Right: 34 oz. paint container.



GENERAL PURPOSE



FOOD PRODUCTS



BEVERAGES



PHARMACEUTICALS

PACKAGING FOR

Safety

Two important factors govern packaging today—conservation of critical materials, and safety for the product. We can't afford to waste a pound of vitally needed steel, tin plate or rubber, nor can we afford to lose the contents of even a single package—whether it be foods, pharmaceuticals or other products, in the manufacture of which valuable materials and time have been expended.

That's why it's important to select your package carefully. Brockway Glass containers give you the

utmost in safety, because they are sturdy to resist packing and transportation breakage. Yet, they have been lightened in weight to save carrying weight and costs, without sacrificing strength. They are fine in appearance, to enhance the products they contain. And, in stock molds, you'll find a wide assortment of shapes and sizes, a few of which are pictured here, that will give you just the container you need.

Ask Brockway for help with your packaging problems.

BROCKWAY

GLASS COMPANY, INC. . . . BROCKWAY, PA.

MAKERS OF *Sani-Glas* PRESCRIPTION WARE



The Symbol of Quality

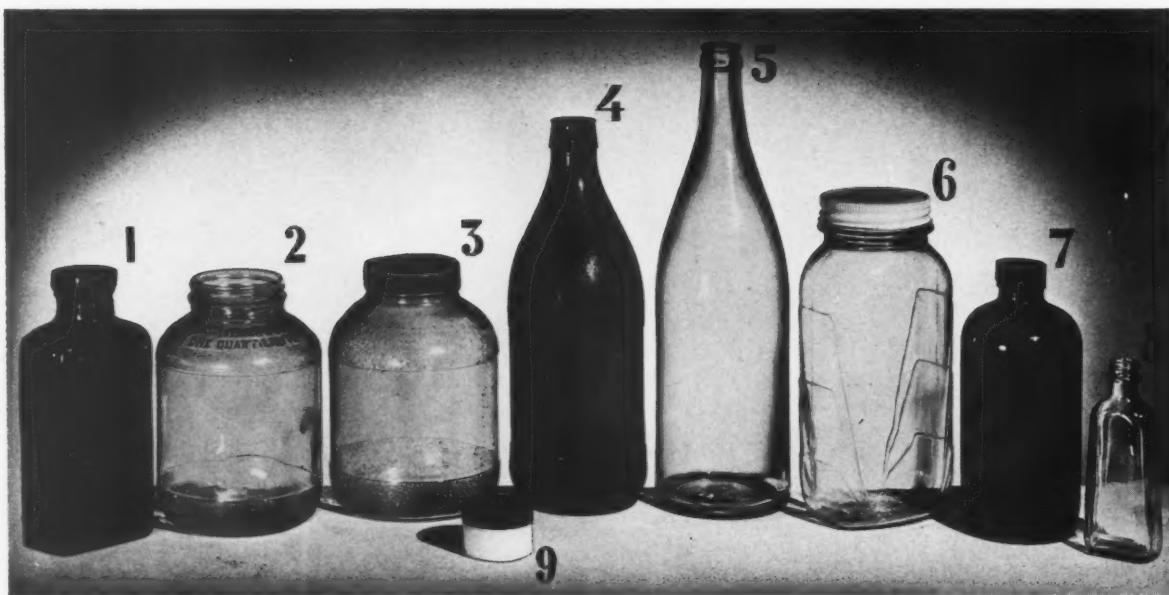
Stock Bottles Not Standardized

For products not specifically mentioned in Order L-103 as amended, in addition to the standardized containers, certain stock mold glass containers are still available which can be furnished by most of the glass manufacturers. The designs for these containers must have been in existence prior to May 11, 1942,

at which time the freezing order was issued. In some cases, modifications have been made from the then existing molds—but these are in accordance with the terms of the freezing order. Some of these containers are illustrated below:

1. Pharmaceutical (Blake bottle)
2. Motor oil jar
3. Coffee jar

4. Motor oil bottle
5. Carbonated beverage bottle
6. Oval bottle for foods
7. Chemical and pharmaceutical (Boston Round) bottle
8. Extract bottle
9. Straight-sided salve (cosmetic) jar



Blood Plasma Bottles



BLOOD plasma has quickly become established as an essential in the medical profession. The armed forces are requiring huge quantities, and hospitals and civil authorities are taking care to have sufficient supplies available to meet emergencies.

Whether for military or civilian use, blood is collected from volunteer donors, and the plasma is prepared in the same way for both military and civilian needs. The bottle at the right in the illustration is the type which is used almost universally, for collecting blood and for the initial steps in the processing. Military authorities have set up standards for the bottles used to contain the prepared plasma and the distilled water which must be available at the point and moment of use. A bottle of this type is shown at the left in the illustration. Commercial firms supplying hospitals and other civilian customers use containers made to their own specifications. The bottle illustrated in center is in extensive commercial use to contain prepared plasma and distilled water.

Familiar to all blood donors are these bottles in which the blood plasma goes to the front lines.

New Perfection

Meet the DROPPING PARTS Challenge of Tomorrow

You, the successful manufacturer of pharmaceuticals, have met the challenge of the day for classic distinction in packaging and labeling. To meet the challenge of tomorrow, where dropping parts are needed, the distinctive and attractive must be combined with functional precision and adaptability.

If you avail yourself of the full resources of the "New Perfection" line, selecting from it the kind, style, color and size of dropping parts which best suit your individual requirements, you can calmly and confidently meet that challenge of tomorrow.

For "New Perfection" droppers are not only mechanically the most perfect ever made, but give you the greatest freedom of choice as to color schemes and special materials to resist oily fluids, chemical and climatic attack.

That's why so many of America's most successful pharmaceutical manufacturers have been using, for many years, "New Perfection" for all their products requiring dropping parts.

A few lines on your letterhead, telling us about your needs, will bring a prompt response, with suggestions, samples and prices.

**PENNSYLVANIA GLASS
PRODUCTS CO.** 428-32 N. Craig Street
Pittsburgh, Pa., U.S.A.

Not affiliated with any other glass concern

NEW!

The "New Perfection" dropper bottle now offers a distinctive new feature, a slightly concave back, to make the bottle lie flat, face up, for greater speed in labeling. Front is designed to provide largest possible label space, so important with such small bottles.

Patented in U. S. A., Canada, Great Britain and other countries.



Single shell metal clutch rubber part; blunt glass.

Regular or acid resisting plastic cap; regular rubber part in various colors; semi-blunt glass.

Non-rolling, extra depth, bakelite cap; non-swelling, Amekine synthetic rubber part, without strong odor; Saftee ball glass.

Hand Made Glass Bottles

THE vast majority of all bottles used today are manufactured on automatic machinery. Glass is made in huge furnaces with materials being mixed by the ton. Molten glass is fed into huge automatic machines and blown accurately to conform to the shape of the molds within the machine. However, the ancient art of glass making still occupies a prominent—and in some respects an increasingly important—place in the packaging picture as a whole.

Where extremely fine work is essential and where limited runs of such work are required, hand made and semi-

hand made glass containers are widely used. Such containers are particularly applicable in the perfume, talcum, bath salts, prescription, wine and liquor trades.

Until the start of hostilities in Europe, a limited quantity of French, Australian and Czechoslovakian glass falling in these categories was imported each year. Since September, 1939, however, American manufacturers of hand made glass have shown their ability to meet all the needs of the market and virtually no dislocations have occurred due to the cutting off of foreign imports. In fact, the probability may now be clearly seen that no extensive import trade will find a basis for existence after the cessation of hostilities, since domestic producers have so clearly demonstrated their ability to meet domestic requirements successfully.

In the process of making a bottle by hand, the glass



1. Clear, hand molded glass perfume bottle with glass stopper. Unusual triangular shape with slight details of decoration on stopper and at the base. 2. Intricately molded perfume atomizer bottle. Design of lines and points which radiate from the base give crystal-like and sculptured effect to the bottle. Closure is of gold color metal. 3. Simple bottle in pyramid shape. Walls are sturdy and bottom and neck are fully annealed for maximum strength. Stopper of glass has distinctive ridged design. Bottles like these are made of carefully selected materials entirely free from impurities. Photos Kimble Glass Co.



blower inserts the blowpipe, an instrument about 4 ft. long, into the pot of glass and withdraws a sufficient amount for the bottle, at the capacity required. A hand skilled in feeling the weights is imperative as too much glass would decrease the capacity of the bottles, while too little would increase the capacity, besides making it too frail for average handling.

The glass is then rolled on a smooth flat surface to eliminate any wrinkles that may have formed while the glass was being taken from the pot, leaving an almost perfect piece which is placed in an iron or steel mold. The mold is made in two parts, each containing a cavity of a size equal to half the size of the bottles with a bottom plate for a base.

When the mold is closed around the glass, the blower sends sufficient wind through the pipe to spread the glass evenly against the walls of the cavities, forming the bottle. The mold is opened immediately and the bottle is taken out with pincers, and weighed. The necks are reheated so that a smooth open mouth and a proper finish can be formed with a tool.

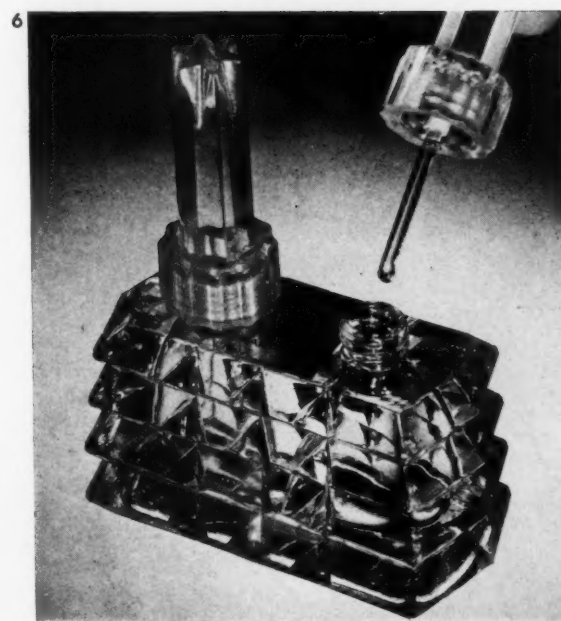
If the bottles are allowed to cool rapidly, they become extremely brittle, causing them to break from the least vibration, so they are placed in slow moving lehrs that cool them gradually, giving them the proper temper.

The bottles that pass inspection have their stoppers ground-in and tied to the necks to insure against the possibility of stoppers being interchanged, as this would cause leakage and evaporation when the bottles are filled with perfume.

While this description of the process is basic, it is susceptible to virtually infinite variations to meet the very specialized requirements of differing designs. For instance, hand made bottles with threaded necks have recently been placed upon the market. These necks are made accurately in accordance with Glass Container Assn. specifications to accommodate standard metal or plastic closures. Thus the container partakes of the advantages of the hand-blowing process, while at the same time achieving a uniformity of closure finish which is most commonly associated with the automatic glass producing equipment.

Glass for hand blown bottles is usually made of very carefully selected and blended materials fused in small batches in covered pots free from the impurities of factory air. Extremely delicate and sparkling effects can be achieved because of the high quality of the glass utilized, as well as because of the interesting effects in design attainable by hand blowing.

The factor of difference in cost between containers from stock molds and from private molds shows a situation for hand blown bottles quite different from that for bottles made by machine. Since only one mold is used by each blower, and since hand blown bottles are produced in relatively short runs, the cost of molds for private mold bottles is generally lower when they are made by hand. This factor alone, however, would seldom be sufficient to swing the decision one way or the other in favor of hand blowing as against machinery for the making of bottles.



4. Hand made bottles equipped with threaded closure finishes. The decorative, unusual shape closures are of metal. 5. Hand blown bottles whose glass stoppers are also hand made. Bottle at the right has recessed and extended panels. 6. A two-cavity hand blown bottle with dual closure finishes and plastic stoppers which have glass applicators. Bottles such as these illustrated are produced in relatively short runs. Photos Carr-Lowrey Glass Co.

WE PACKAGE *Strength*

That's the principal job
for Hazel-Atlas Glass Food Con-
tainers today...jars and bottles
rapidly produced to keep our
country strong.



WE PACKAGE *Thrift*

Hazel-Atlas Re-Use Pack-
ages fill many packers' needs.
Appreciated by the housewife,
they are attractive and useful.





WE PACKAGE
Health
AND
Beauty

Hazel-Atlas Cosmetic
and Pharmaceutical Containers
are identified with the most
famous products on drug store
shelves.

WE WORK FOR
THE *Present*
WE PLAN FOR
THE *Future*

Until the peace is won
our problem is mass production
and standardization, but our re-
search for the future continues
unceasingly. The problems
solved today will add materially
to tomorrow's progress.



HAZEL-ATLAS GLASS CO.
WHEELING, W. VA.

Pottery Containers

STILL classed largely as a luxury item, pottery containers continue to hold the center of the stage as one of the more attractive members of the container family. In relatively few instances has the utilitarian property of this material been emphasized—and this for a few reasons which may in the near future be overcome and the new means used to increase pottery's use in American industry.

To consider the utilitarian role first, consideration should be given to the huge pottery jars in which chemical plants are now packing such commercial items as mercury, iodine, bismuth subiodide and the like, where the jumbo-size jugs carry a burden dropped by war-requisitioned metal containers. Both for shipping and local storage the stone crocks have been found to be doing a good job.

Another large user, a war baby as it were, is the U. S. Navy which has ordered vast quantities of bean pots—probably not so much for transportation from central galleys as for serving pots. Otherwise, pottery ware has not been widely adopted as an aid to the all-out war effort.

One of the principal reasons is the difficulty of obtaining a satisfactory closure for the clay container that will not involve the use of critical materials. The most satisfactory closure is one which requires a metal clamp and a ring of rubber for perfect sealing. Neither material, obviously, can be used extensively, if at all, for the usual civilian requirements.



Ordinary clay covers or lids have a tendency to ride away from the container and while cellulose sealing rings may serve to take the container from the packer's factory to the consumer's kitchen, the problem of preserving partially emptied containers is one that has not been satisfactorily solved.

Chief uses of pottery

Use of the container made of the crust of Mother Earth therefore continues along the customary lines—for cheeses, for decorative purposes to carry perfumes and for some liquors where natural cork is still available for closure, or where the after-opening seal is not too important.

Probably man's first step in the direction of civilization was taken in the development of his skill in the use and design of clay containers. Historians today place a great deal of faith in their ability to trace long-forgotten peoples by the clay pottery remnants they have left behind. With the growth of skill and discovery of new compounds, better types and grades of pottery came into being—but there is still a strong family resemblance between the beautiful symmetrical demijohn filled with scented bath salts and the crude, sun-baked vessel from which the neo-something warrior drank his goat's milk. Some of this family resemblance is studied and deliberate, to be sure; all of it is artistic, and pottery, as always, remains an attractive means of packaging food and beverage and toiletry.

This consideration, plus the "premium value" of a pottery container for re-use, has kept it in the top ranks of the luxury items. Pottery containers have been a "natural" for gift packages—for here the contents are often less important than the container, and the ultimate traffic will bear the additional cost of shipping and production, and the breakage mortality. The quaint-appearing earthenware jar is an acceptable gift whether it be presented empty or filled with cheese, liquor or perfumes.

Pottery in wartime

From the practical standpoint, earthenware has been used for many commercial years to package condiments, spices, bulk butter and cottage cheese. Most of us remember the vinegar and wine jug (and the brown jug Uncle George took with him at haying time), and to some extent these uses are coming back. But other considerations are not as yet such that the future looks too good for pottery to take up much of the tin can's former burden. Coloring of the pottery product has become in-

Durkee's spices in pottery gift package create a holiday atmosphere of their own. Photo Durkee's Famous Foods.

creasingly difficult since the war's opening guns. Blues and reds are particularly difficult to obtain, though greens, brown, ivory and whites are still available. Black is completely out because of the fact that the essential ingredients are high on the priorities lists.

Wide use of clay products for many non-container uses—such as dipping baskets for plating of metals, as dishes for steam-tables and the like—is another factor which serves to keep makers from giving too much attention to civilian packaging needs; deliveries at best are far behind schedule if at all considered.

Strictly speaking, "pottery" springs from the French *poterie* and includes all objects made of clay. Earthenware and stoneware are interchangeably used for various processed forms of pottery, while porcelain is, properly, applied only to certain definitely designed varieties of pottery which are obtained in a special way. Porcelain, rightly, covers only products having a translucent quality. Porcelain originated in China and came thence to Europe where alchemists tried to duplicate the effect but failed because they tried to mix glass with clay. The Greek word *keramos*, meaning potter's clay, gave us the word "ceramics" as today's generic term for the entire field of pottery.

Color in pottery depends upon the locality from which the clay is obtained, the composition of the body, and the method of firing. The amount of iron, for instance, is important in giving color to the product. Because good clays are found in most parts of the United States, home-made pottery is as good as any made anywhere. Lacquers and varnishes add to the possibilities of decorative treatment as well as the firing conditions. While the Chinese used cobalt to give color to their clay products—being one substance they knew that could stand the high temperatures—modern chemistry found others; but these are temporarily out of use for the duration.

High-temperature firing is vital if pottery is to have the vitreous protection required by certain contents and that is a point that must be considered when selecting pottery containers—absolutely moisture-proofed con-

tainers must be had only in limited colors, for certain hues will not stand the high temperatures that their more drab cousins take with greatest of ease. Unglazed pottery is highly porous and has a tendency to sweat—which is a reason that they are often preferred for cheese products; cheeses age better in pottery. It must be remembered that additional colors in a pottery container means additional firing and thus increase final cost.

Self-material lids, cork, wood and plastics are generally used for closures, and in nearly every case they require an additional device such as a clamp, an adhesive strip, sealing wax or similar material to keep them in place. While attractive, many of these are not permanent so that the artistic appeal of the pottery container remains its chief characteristic that gives it the preference over others. It is this, however, which does such a good sales job that extra cost can be discounted.

Packaging problems can, however, be safely placed in the hands of most of the pottery makers with good assurance that they will come up with an adequate suggestion and a practical design for marketing.

Shulton's Old Spice Toiletries for Men assume substantial dignity and distinction in their ceramic containers. Photo Shulton, Inc.



ARMSTRONG HAS A COMPLETE LINE OF

Wartime Glass Containers

**TO MEET EVERY GLASS
PACKAGING NEED**

FOR FOODS, DRUGS, OR BEVERAGES—and for an almost unlimited range of allied products—there's an Armstrong's Glass Container in flint or AMBER glass to solve your wartime packaging problem. These utility containers are light in weight, yet tough enough to stand up under normal handling. They comply with all current wartime restrictions on glass container design.

Best of all, Armstrong's Wartime Glass Containers can be made to do a selling job for your product. The

clear, sparkling glass gives customers an inviting view of your merchandise. There's plenty of opportunity to use Armstrong's Lithographed Caps for extra decoration, smartly planned labels for effective mass display.

Write today for full details in Armstrong's new free booklet, "Men and Glass." Armstrong Cork Company, Glass and Closure Division, 910 Arch Street, Lancaster, Pennsylvania. Plants located at Millville, New Jersey, and Dunkirk, Indiana.



ARMSTRONG'S CLOSURES

turn standard containers into standout packages

Armstrong's Metal Caps, brilliantly lithographed with your name or trade-mark, will help sell your wartime packages. Armstrong's complete closure line includes corks (straight or topped), crowns, Artmold (plastic) Caps, and distinctive CEL-O-SEAL Bands.





ARMSTRONG'S STANDARD JARS—Light, strong containers for products requiring wide-mouth ware. Sizes 4 1/4 oz. to 34 oz.



ARMSTRONG'S STANDARD BOTTLES—Narrow-mouth containers for foods in liquid form, juices, syrups, etc. Sizes 4 oz. to 32 oz.



ARMSTRONG'S BLAKES—Light-protective AMBER bottles for chemicals, pharmaceuticals, etc. 20 sizes from 1/4 oz. to 32 oz.



ARMSTRONG'S BOSTON ROUNDS—An old standby among manufacturers of liquid products. 8 sizes from 1 oz. to 32 oz.



ARMSTRONG'S STANDARD BEER BOTTLES—Handsome, AMBER bottles available in 12- or 32-oz. capacity, Export or Steinie shape.



ARMSTRONG'S STANDARD LIQUOR BOTTLES—AMBER glass has the look of quality. Round quarts, fifths, flask pints, 1/2 pints.

ARMSTRONG'S GLASS



and **ARMSTRONG'S
CLOSURES**



Containers Fabricated from Glass Tubing

by E. B. Dennis, Jr.

A **W**HOLE group of glass containers, widely varied in appearance and application, is fabricated on precision machines from machine-drawn glass tubing. Modern methods result in evenness of wall and freedom from distortion of vision without sacrifice of strength.

Glass vials are widely used for packaging liquids, powders and tablets when a small, convenient and light container is required. Attractive in themselves and permitting the product to be seen clearly, they have obvious advantages in many cases.

Glass ampoules are accepted in pharmaceutical practice as the best and often the only practical means of providing absolute sterility and maximum protection over an indefinite time combined with utmost convenience in handling and using.

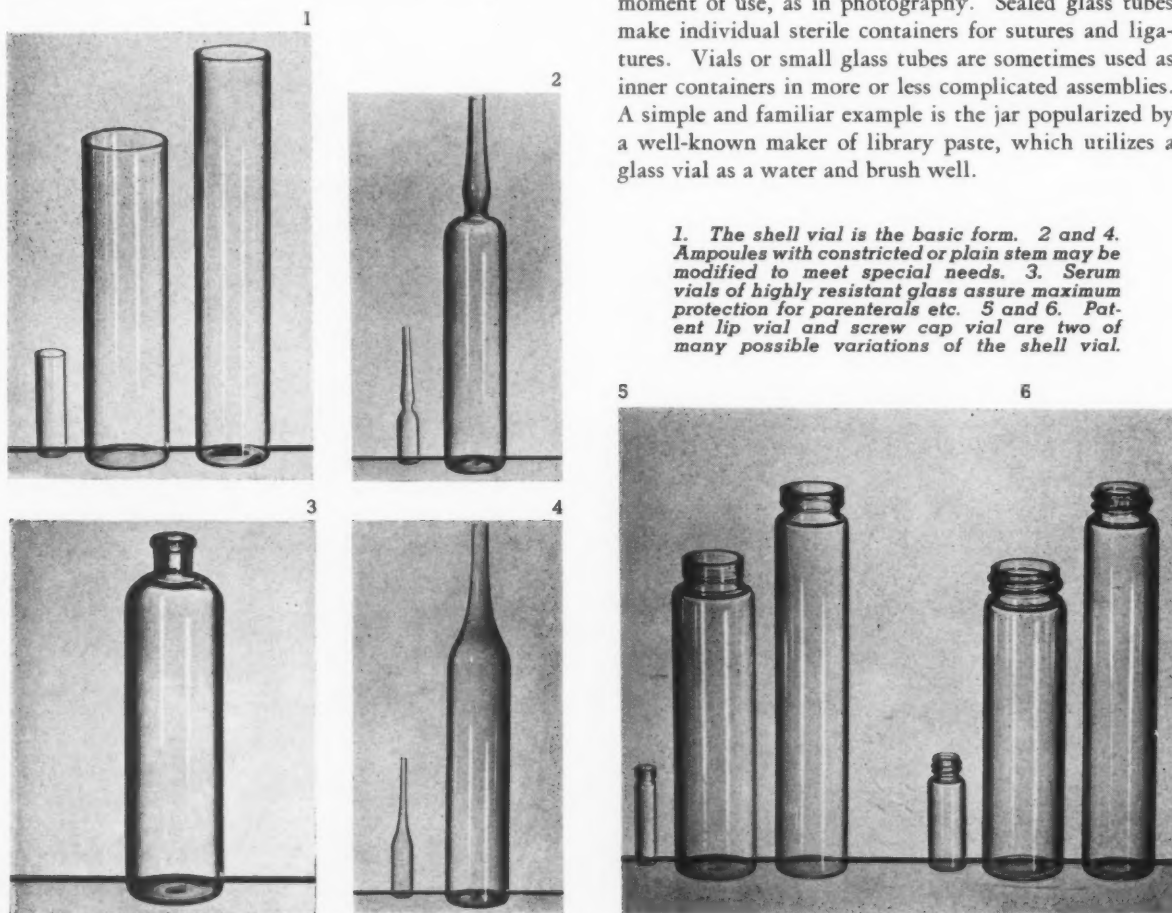
Standard types such as those illustrated are ordinarily available from manufacturers' stock. Special requirements, of which there are many, can usually be met with little difficulty or extra cost, as the machines used for fabricating these articles are remarkably adaptable. Thus a considerable range of special sizes, designs and

finishes is available on order and special glass may be obtained for special requirements. Vials can be made with flat or oval bodies, with round bottoms, open at both ends, with neck finishes modified to take a variety of closures. Ampoules of special styles, tolerances and sizes are often manufactured to order.

Glass vials and ampoules offer attractive possibilities in labeling. Metal or paper may be used, or the design and inscription may be printed directly on the glass itself. If permanency is desired, colored ground glass in suspension may be fused into the vial surface.

Some special applications are interesting. Ampoules especially have come into wide use among our armed forces and elsewhere as a convenient means of distributing small portions, not only of drug but of other liquids. New research and design have triumphed in meeting new and highly specialized demands. A long vial of small diameter with a special finish makes an admirable iodine applicator. Vials and tubes with a closure at each end and a division in the middle have been developed to contain two different chemicals intended for mixing at the moment of use, as in photography. Sealed glass tubes make individual sterile containers for sutures and ligatures. Vials or small glass tubes are sometimes used as inner containers in more or less complicated assemblies. A simple and familiar example is the jar popularized by a well-known maker of library paste, which utilizes a glass vial as a water and brush well.

1. The shell vial is the basic form. 2 and 4. Ampoules with constricted or plain stem may be modified to meet special needs. 3. Serum vials of highly resistant glass assure maximum protection for parenterals etc. 5 and 6. Patient lip vial and screw cap vial are two of many possible variations of the shell vial.



CLOSURES

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Government Closure Restrictions

by Dr. Julian H. Toulouse

WARTIME demands have resulted in shortages of many of those materials normally used in the manufacture of glass containers. Aluminum, brass and zinc of the sheet metals, aluminum and tin of the foils and vinylite and plicofilm of the plastic films are no longer available. Nearly all of the remaining materials including tinplate, terneplate, blackplate, molding compounds, cork and protective coatings for both paper and metal are under restriction. The limited stockpile of rubber has made necessary a strict curtailment in its use either in the form of sealing gaskets or compounds.

In spite of these restrictions, the use of glass containers has been greatly increased because of the use of glass as a substitute for containers made of even more critical materials. The glass container manufacturing industry and the users of glass containers are between the two extremes of the increasing use of glass as a wartime measure and the decreasing use of critical closure materials as an equally important wartime need.

Government restrictions on closures unfortunately arise in several groupings of WPB other than the Containers Division. To the general user of closures this is unfortunate, because lack of centralization makes it difficult for many users of closures to keep posted on the ever-growing restrictions, or to even anticipate the source of new restrictions.

The restrictions all arise out of shortages of critical material. When orders other than those of the Containers Division are issued, they represent the efforts of those controlling the critical material to evaluate the various uses of that material.

Of these materials, and in spite of increased demand for glass containers, steel and tin usage in the glass container industry has been cut almost in half. The elimination of rubber from less essential items, and from even essential items not requiring rubber sealing for primary preservation, has allowed increased packing of essential foods needing rubber for preservation without increasing the rubber demand. Paper use has increased with its development as a substitute, although some decrease in cap sizes has held the increase to a nominal figure.

Trend of restrictions

It would be impossible in an article of the present scope to include complete details as to the limitations on closures imposed by War Production Board through its various orders, nor would the reproduction of the orders be practical since they are continually being amended, augmented or revoked in accord with changing conditions. Users and makers of closures in 1943 should, however, keep themselves informed by having available copies of these orders, with their latest amendments.

There are several trends ranging from restriction to complete prohibition. These are listed herewith,

with specific examples of the type of application:

- a. Reducing size of closure:
 - (1) By Limitation Order L-103,
 - (2) Saving up to 40% of metal, 15% of rubber compound.
- b. Elimination of smaller packages:
 - (1) By Limitation Order L-103,
 - (2) Saved metal, rubber, shipping.
- c. Elimination of tin coatings:
 - (1) By Materials Order M-104,
 - (2) Saved over half of tin previously used, by denying tin for coating crown caps for beer and beverages and for coatings on closures for many other items,
 - (3) M-21-e also governs general tin-coatings.
- d. Reduction of tin coating thickness:
 - (1) By Materials Order M-104,
 - (2) Standardization to 1.25 lb. base box maximum.
- e. Elimination of rubber:
 - (1) By Materials Order M-104 (and by M-119),
 - (2) No product not listed in M-104 may use rubber for sealing purposes.
- f. Reduction of amount of rubber:
 - (1) By authority conveyed by Materials Order M-15-b,
 - (2) Reduction in amounts of crude rubber, latex, synthetic rubber and by control of use of reclaimed rubber and certain rubber substitutes.
- g. Elimination of steel:
 - (1) By Materials Orders M-104 and M-126,
 - (2) Steel denied for packing certain products in glass with closures made of steel, including distilled spirits, wines, cosmetics, coffee, tobacco, razor blades, playing cards and gloves, among others.
- h. Reduction of amount of steel:
 - (1) By Materials Order M-104 and Limitation Order L-103,
 - (2) M-104 sets quota restrictions on numbers of packages. L-103 reduces cap sizes and eliminates smaller sizes of containers.
- i. Reduction or limitation of protective coating materials:
 - (1) M-25 places protective coating use of formaldehyde, paraformaldehyde, hexamethylene tetramine and synthetic resins produced therefrom in Class I, to get first choice, after military use, for industrial, food and medicinal container protective coatings,
 - (2) M-56, defines uses of natural resins.
 - (3) M-139, delivery and use of phthalic-alkyd resins subject to direction of WPB by specific authorization for each use and purchase.
 - (4) M-254, delivery and use of para-phenyl resins subject to direction of WPB by specific authorization for each use and purchase.
 - (5) M-116, revoked Dec. 17, 1942, limited use of protective coatings for closures to specifically protective use, keyed to the needs of the metal base. Regardless of the revocation, the restrictions of other orders still hold.
 - (6) M-246, phenolic resins and phenolic resin molding powder. Delivery and use subject to direction of WPB by specific authorization for each use and purchase.
- j. Elimination of zinc:
 - (1) By Materials Order M-11-b,
 - (2) Denial of zinc for glass container closures.
- k. Restriction of cork:
 - (1) By Materials Order M-8-a,
 - (2) By placing cork for crown liners on a month-to-month basis. The restrictions were largely superseded by the more stringent provisions of M-104, but M-8-a will govern if cork scarcity requires further restriction.
- l. Regulations of plastics for molding:
 - (1) M-25, establishes order of priority ratings for formaldehyde, paraformaldehyde, hexamethylenetetramine and synthetic resins produced therefrom. Closures, except decorative, containers for industrial, food and medicinal containers, in Class I, for first choice after defense uses.
 - (2) M-154, prohibits use of thermoplastics for a number of purposes. Glass container closures not listed at present for denial, but the physical properties of many thermoplastics will limit their uses for such closures.
 - (3) M-260, acrylic monomer, and acrylic resin. Delivery and use subject to direction of WPB by specific authorization for each use and purchase.
 - (4) M-254, Para-phenyl-phenol resins subject to direction of WPB by specific authorization for each use and purchase.

- (5) L-159, prohibits manufacture of plastic molding machines except by authorization of WPB
- (6) M-246, phenolic resins and phenolic resin molding powder. Delivery and use subject to direction of WPB by specific authorization for each use and purchase.
- m. Regulation of synthetic film materials:
 - (1) M-240, vinyl acetate. Placed under direction of WPB by requiring specific authorization for each use. In general, no vinyl products will be available for closure use.
- n. Restriction of aluminum:
 - (1) M-1 and supplements. M-1-g covers aluminum pigments. M-1-i covers aluminum consumption. M-1-d covers aluminum scrap. The use of aluminum is under the direction of WPB. None is available for use as closure, or in connection with closures.
- o. Rubber hydrochloride:
 - (1) M-15-b includes rubber hydrochloride. Its use in closures is impossible except for direct military needs.
- p. Synthetic rubber:
 - (1) M-13 places synthetic rubber on the same restrictive basis as natural rubber under M-15-b.

Discussion

The listing given above is probably not complete, nor is it intended to indicate the sole sources of restrictive orders. Conditions change rapidly and official Government sources must be consulted frequently in order to keep in step with changes and additions.

The use of substitute materials should be developed in every way possible, for the fact that a material is critical enough to be restricted indicates that any increase in the degree of criticality will bring further restriction.

A. Reducing the size of the closure

The greatest over-all reductions of metal and rubber are being brought about indirectly—by limiting the size of the glass container opening through glass standardization orders. These orders are the various schedules to Limitation Order L-103. By the schedules the packing of certain commodities is limited to definite sizes and in most cases to definite shapes of containers whose dimensions are fixed. This method of restriction is perhaps the most painless of all, for the absence of quantity or quota provisions allow the products of the industry unrestricted quantities of glass when coupled with restrictive orders on closures. The use of substitute closure materials is encouraged. The net result is less tonnage of glass-making materials, less fuel, less transportation demand, but with full ability of essential goods to go to market.

Examples of the reduction of closure materials by this method can be given as follows:

Container Capacity	Old Size Cap	New Size Cap	Percent Savings in Metal	Percent Savings in Rubber
Gallon	120	89	74	35
Gallon	96	89	22	8
Half-Gallon	96	83	36	15
Quart	70	63	46	11
Half-Pint	70	58	72	21
Half-Pint	70	53	83	32

Savings in closure metal, tin, lacquer and lining material vary approximately as the square of the diameter of the caps; rubber varies approximately as the linear function of the diameters. Based on 1941 production of glass containers for food use alone, this program should save 22,000 tons of closure steel per year, or about 38 per cent of the total formerly used.

B. Elimination of smaller packages

L-103 has brought about a general limitation on small size packages. Smaller sizes generally are eliminated. Examples are the miniature whiskies (Schedule A), split beers (sizes smaller than 12 fl. oz. in Schedule B), miniature and split wines (Schedule D), sizes of preserves less than one pound and jellies under twelve ounces weight (Schedule C). The theory is that since a closure on a larger size takes less metal than that for two closures on a smaller size metal savings are made by prohibiting the smaller size. The upper limit of such procedure is the debatable minimum size that can be used by a consumer without waste.

C. Elimination of tin coatings

With the issuance of M-104, certain commodities were denied tinplated closures. The tin saved by the first issuance of M-104 was almost half that used for all glass containers, since the large group of beer and carbonated beverage crowns included over 40 per cent of the tin used. Other items included oils, paints, certain dry chemicals, oil-bearing foods such as peanut butter—in short, most of the non-acid foods and other commodities. Later other items were added. The present version of M-104, issued in January of 1943, has added a few items to the list. In general, any product not acid enough to attack the closure metal vigorously, will be required to use blackplate.

In this connection, the blackplate provisions of M-81, the tin can order, give little guidance. Products in cans are in contact with the metal-backed areas at all times, but in glass containers, the product is seldom in contact with the closure, and any attack of the closure metal is markedly reduced. Additional savings of tin are therefore possible with glass.

D. Reducing the amount of tin

Because of the statement just made, it is apparent also that the thickness of tin plating can be reduced just as soon as electrolytic tinplate can be made available. Commercial use has already been made of this form of tinplate in the packaging of foods difficult to pack.

E. Elimination of rubber for sealing

On April 9, 1942, the issuance of M-119 paved the way for important restrictions on the use of rubber. A list of 41 items was attached to the order, for which rubber-sealed closures were denied. This order had several effects, as follows:

1. The virtual elimination of such products as animal food, corn-on-the-cob, greens, macaroni, spaghetti, potato products, soups, sweet potatoes, turnips and whole apricots, whole carrots and whole pears.
2. The elimination of high vacuum packing (pending the development of non-rubber substitutes) from pickle products, coffee, mayonnaise, nuts, peanut butter, sandwich spreads, shortening, and tobacco, where vacuum packing was highly beneficial but not absolutely required for preserving products from bacterial spoilage.

3. The elimination of rubber seals for syrups, honey, sauces, vinegar and similar products where vacuums were developed as a result of hot pack processes, but of medium degree, and not vitally connected with preservation of the product, either for sterility or flavor.

F. Reduction of the amounts of rubber

In other directions, under the effect of Materials Order M-15-b, the Rubber Division of WPB acted to reduce the amount of virgin rubber used, either by substituting reclaimed rubber or by over-all reduction of rubber hydrocarbons, from either crude rubber or latex sources. Reduction of the size of cap under L-103 further reduced the rubber demand, and reduction of the size and thickness of rubber rings and flowed-in compounds added more savings of this critical material.

In general, there is assured for those products allowed to use rubber because of real necessity for rubber seals, and importance of the product itself, enough rubber for limited increase of the pack. M-104 points out these limits, especially in the case of conversions from metal to glass containers. In many cases this amount should be increased, and should by all means be raised as soon as military needs can be met by the program in synthetics. Foods, which are virtually the only products permitted to use rubber, should rank above most civilian needs.

G. Elimination of steel

The lead in elimination of steel was taken by Order M-126. Included in that order were containers for a number of products. The order was directed at all-metal containers, but was considered to refer to closures as well. This led to amusing but embarrassing contradictions, one of which was the denial of metal for one product for containers and *closures* for sizes under five gallons. By the wording of the order, metal for packing five gallons in all-metal containers was justified, but not the use of the same quantity of metal for making 142 caps, which if applied to gallon jars, would have covered that many gallons of product, or 28 times as much of the product. Such contradictions are an argument for placing all control of containers in the one division set up for the purpose. After some difficulty, the order was clarified.

Order M-104 also brings about an elimination of steel. By one of its amendments, the use of metal for making closures for wines and liquors was stopped. Later when the order was changed from negative (allowing any commodity not listed) to positive (allowing only those commodities listed) restrictive form, many items automatically joined the group of those not allowed steel closures.

H. Reduction of the amount of steel

In addition to the reduction of steel used by the provisions of L-103, there are many reductions in amounts through assignment of quotas by M-104. These quotas appear throughout M-104 as amended January 2, 1943, when the order became positive in character. In some cases the quota is an increase over 1942, but this usually

is for a food product whose packing is to be encouraged. In many cases the quota is a percentage of a combined metal-and-glass-container pack, with the emphasis on conversion to glass, where every unit of conversion is an over-all saving of metal.

I. Reduction of protective coating materials

Two classes of orders bring about the reduction of protective coating materials: L-103 and M-104, through reduction in closure sizes and quantities; and M-116, through regulation of the kinds of coating materials permitted. The latter was later revoked when the more restrictive primary materials orders were written.

Difficulties in substitution

As a guide for further experimentation, the following are listed as the chief demands of glass that make substitute closures difficult.

(1) *The tolerance requirements of glass*—Glass may still be considered normal and commercial with variations of plus or minus twenty thousandths of an inch (± 0.020) from ideal dimensions. Glass must be commercially acceptable when slightly out of round, or with variations in the plane of the top surface. It is for this reason that a yielding cap and cushioned gasket material are necessary.

(2) *Means for mechanical adherence of closure*—There are three means of adhering a closure to the glass finish:

- (a) by vacuum,
- (b) by friction (milk bottle seal or side seal with gasket),
- (c) by mechanical protuberances (threads, lugs, etc.), which call for mechanical strength of the closure.

(3) *Damage to glass surface by closure*—Steel in closures is lubricated to some extent by coatings and the like; plastics are softer than glass, so that no damage usually occurs. Ceramics are hard and will damage glass by seizing. A damaged glass finish is liable to break under impact or strain.

(4) *Difficulty or ease of removal*—Without expanding this paragraph into a chapter, little detail can be given. "A closure should hold until it is to be removed, then it should come off easily," may be "copy-book," but it tells the story of consumer acceptance.

(5) *Stiffness*—Closure materials must be stiff enough to hold threads or lugs, and must not become dished under vacuum, or domed under application of pressure. Yet, the material must not be as rigid as glass, so that it may yield and adapt itself to the glass surface. At the two extremes lie paper and ceramics. Steel and plastic caps approach the ideal.

(6) *Moisture*—Closure materials should not be appreciably affected by moisture, either as to strength or dimension.

(7) *Torque*—The finished closure, if of a screw type, should be able to withstand a torque of from 15 to 40 in. lbs. without breakage or distortion, and should be removable with about the same amount of force.

Standard Types of Closures

by L. A. Von Till

CLOSURES for glass containers belong to either of two classes—1. Primary closures or 2. Secondary closures. Frequently both classes are embodied in a single closure.

The *primary* closure of a glass package is the one that has any portion of its inner surface exposed to the contents. Depending on the construction and size of the container finish and the closure, the area of contact between the inner surface of the closure and the product may be large or small.

A *secondary* closure is one that does not come in contact with the glass-packed product. It may be used: (1) as a dust cover to keep the whole neck of the bottle or jar clean for dispensing purposes, (2) as a cover for whatever part of the product remains in the container after the primary seal is removed, (3) as a decoration to "dress up" the package or (4) to hold the primary seal in place on the glass finish.

Primary closures

The function of a primary closure is to seal the bottle and to remain securely in place until the consumer opens it. Every primary closure consists of:

1. A sealing surface, to be pressed against the sealing surface of the container.
2. A cover portion for the mouth of the container.
3. Some means of securing closure to container.

The sealing surface of a closure is usually a gasket or liner (that is not affected by the product) backed with a compressible material which will conform to the contour of the sealing surface of the container. The gasket may be a single material which combines both the "product resistant" qualities and cushion (compressible) qualities—for example, rubber, cork, etc.

The first thing the packer must know about his closures is whether it provides the degree of sealing required by the product. Properly applied, a closure may be air-tight, liquid-tight or simply siftproof. It may be designed to hold internal pressure of varying amounts, to vent and re-seat after venting, or to hold a vacuum. The degree of sealing depends primarily upon the nature of the material used for both liner and backing and the pressure exerted by the cap on the liner. For a certain degree of seal some types of closures are more appropriate than others. If a product is to be processed for sterilization after filling, the closure and gasket must be resistant to heat and water.

After the packer determines these facts about his closure, he may turn to such other characteristics as convenience in opening, appearance, cost of application, workmanship and quality, and on these points the arguments of various sales organizations can supply him with complete data.

Types of closures may be more clearly discussed by classifying them according to the methods used to secure them to the finishes. The sealing surface of the bottle may be on the inner surface of the neck, on the top of the neck or on the outer surface of the neck; therefore, closures are designed for inner seal, top seal or side seal. The *inner seal* is formed at the inside periphery and below the inner edge of the container mouth. The *top seal* is formed on top of the container rim. The *side seal* is formed on the outside periphery and below the outer edge of the container mouth. Thus classified, closures fall into five types:

1. **Friction seals:** The oldest method of sealing is by compression of a resilient material which is held in place by friction; for example, the common cork, which makes an inner seal. A variation is the friction pry-off which is a side seal. In some cases, the latter type of closure is used to reinforce a vacuum seal, so that two principles are used to effect liner compression on the sealing surface.

2. **Screw or lug seals:** About three-quarters of all glass containers for all purposes are sealed with screw or lug caps. Here again the seal may be used to reinforce a vacuum seal.

3. **Formed seals:** A third way of sealing is to finish forming the closure on the bottle using the finish of the bottle as a mold. The crown cap is an example.

4. **Vacuum seals:** A fourth method of sealing depends solely on the difference in pressure between the inside and outside of the sealed container to secure the closure to the finish. The inside pressure must be less than the outside, hence there must be a vacuum within the container and the sealing gaskets must be of a suitable nature to hold the vacuum.

5. **Combination and miscellaneous seals:** Some seals are effected by using a combination of two or more of the four types already described.

Within each of these general divisions there are many variations.

Friction closures forming inner seals may be tapered ground surface glass plugs. The most popular friction closures are cork stoppers. They may have straight sides (wine and whiskey), tapered sides (miscellaneous jugs and flasks), champagne style or cored for use with sprinkler tops or applicators. The corks may have tops of plastics, wood, metal or wood covered with metal. Side seals by friction only are most common on tumblers. On jars, combinations of side friction and vacuum are frequently used, and the glass finish is often provided with a ledge for pry-off opening. Vapor vacuum, steam vacuum or other vacuum-sealing processes often combine friction side-sealing with the vacuum sealing.

Screw closures: May be deep or shallow caps, the deep

screw having a skirt about one-third deeper than the shallow. They may be single shell, with the threads exposed; double shell, with the threads concealed in an outer casing; or the outer casing and concealed thread may be made of a single piece of metal. They may be of metal, or plastic, or both; in this time of shortage of critical materials, wood, compressed paper pulp and clay are also undergoing experimentation to develop commercial screw closures made of them. The caps may be knurled, semi-knurled or unknurled. The skirt may have an outwardly rolled edge, a raw edge or a turned-in rolled edge. The top may be domed, partially domed, flat, or have a depressed ring. Lug caps are variations of screw caps, since the lug acts as an interrupted thread. The lug may be made by indentations in the skirt, or by turned-in projections on the edge of it.

Formed closures: The most familiar of the caps formed on the finish of a bottle is the crown cap, used for beer, carbonated beverages, condiments, etc. Another type of formed cap is the *roll-on*—a piece of ductile metal in which the threads are formed by the capping machine (during cap application at the packer's plant) to conform to threads on the finish of the bottle. Another type of formed cap is the chuck crimped type where the chuck on the capping machine collapses or squeezes the skirt of the cap, or the gasket in it, against the side-sealing surface of the finish.

Vacuum only: Caps, under which vacuum may be obtained by special sealing machines, by cooling and contraction of hot packed product, or by some combination of these methods.

Miscellaneous and combination caps: The band-cap is an example of this type. It is one in which a metal band applied with a sealing machine has its lower edge crimped under a ledge on the container finish and its upper edge crimped over the top corner of a sealing disc or cover, which often is also held under vacuum. Bands

in the form of a tear-off, or separate removable band around the finish of a container, are often used as supplementary seals to hold a cover cap in place and prevent it from accidentally becoming loose. When made an integral part of the primary closure it makes it tamper-proof.

Many further variations of the other four main types have been developed for specific products. The packer is sure to find several competing types which are appropriate for his product and package.

Secondary closures

Among the secondary closures are the so-called cover caps, frequently used to protect the primary closure or pouring edge of a bottle. Many milk bottles have cover caps of paper or (formerly) aluminum foil, and distillers often used a hood of gold or silver foil over the cap to dress up the package. Catsup cover caps made of tinplate are used as covers for partially filled bottles after the primary closure such as a crown or formed cap has been removed. Many secondary closures are made of cellulose cups, either opaque or transparent, sealed over the primary cap on the finish.

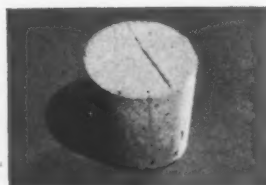
In this classification also are a variety of tamper-proof closures, usually metal strips which bind the primary closure and must be destroyed before the bottle can be opened. Here, too, is the cellulose disc applied inside the primary closure, secured by an adhesive to the sealing surface of the bottle.

The virtues of packaging in glass under closures are too well known to require further description. For the proper type of closure and glass finish to specify for a given set of packing conditions, consult the manufacturers of closures and glass containers, many of whom are equipped to offer to the trade without charge free laboratory and engineering services, in addition to the wealth of experience which they all possess.

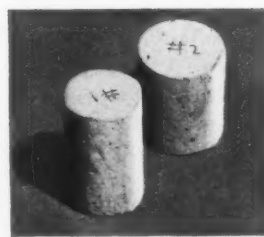
GROUP 1—FRICTION SEAL



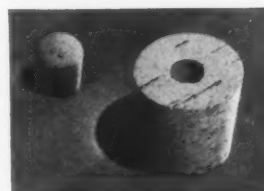
Champagne cork for foreign or domestic champagnes. It is made from selected and tested corkwood in two types, for first and for final bottling



Tapered cork. General-use closure for bottles, jugs, flasks, etc. Manufactured in a wide range of grades, tapers and sizes



A straight cork. For use in sealing still wines (dry and sweet). Oversize, and driven under compression into bottle. Tap cork. Inserted in bushes in heads of kegs in cooperage factories or breweries



Round top cork. Variation of tapered cork, with same uses. Shell cork. Used with glass or fancy stoppers, sprinkler tops and as orifice reducers



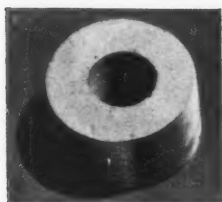
Flanged cork. Flange facilitates removal of closure from bottle. For whiskey containers and for use with the various types of tamper-proof outer seals



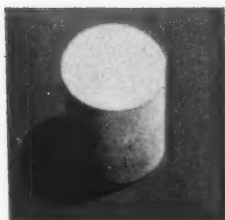
Wedge top cork. Ordinary tapered cork with formed top. Essentially a closure for perfumes and cosmetics



Specie cork. Pores of corkwood run from top to bottom instead of through the diameter. For sealing laboratory glassware, certain dry chemicals and for mustard, horseradish, etc.



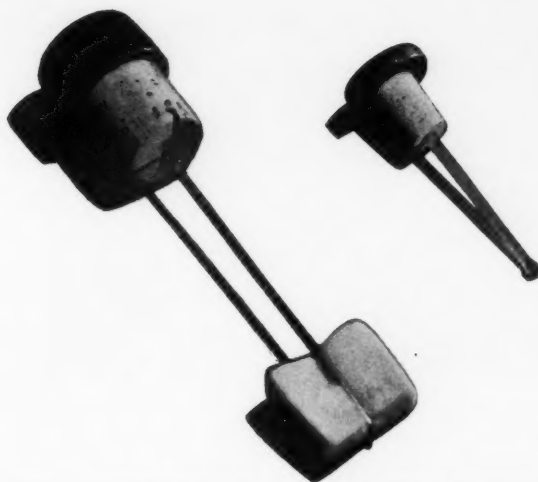
Orifice reducer. Shell cork which may be equipped with metal fitting and used to convert standard cork or screw finish into shaker type unit for dispensing



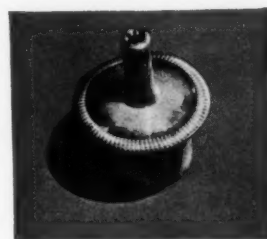
Rubber cork or stopper, used for bottles containing ammonia and certain corrosive chemicals, etc.



Topped corks used for sealing liquors, perfumes, essential oils, extracts, etc., are of three types: Right. Molded plastic top attached to cut cork. Left. Lithographed metal top cork. Center. Embossed wood top cork



Corks with wooden tops. Left: Dauber. Right: Applicator



Sprinkler cork. Metal sprinkler inserted in shell cork. Used for dispensing liquids such as hair tonic



Anchor D cap. Side seal; air-tight or vacuum. For jars, bottles and tumblers

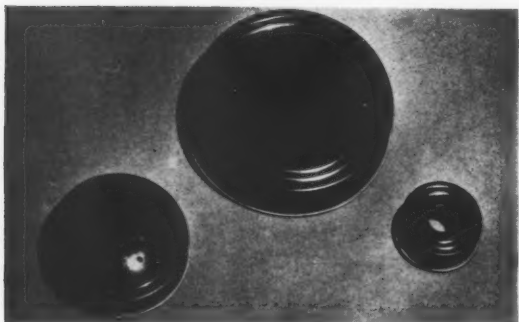


Crown catsup cover-cap. Friction type with small lugs. Right: Cover-cap, screw type, for catsup

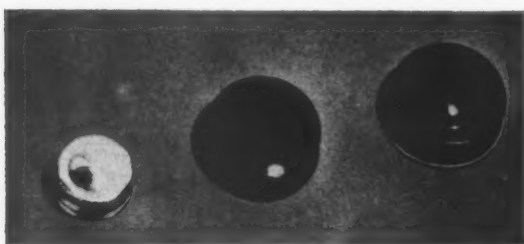


Lock-Tite slip cover. Used on cans or pails of paint, varnish and certain food products. Pry off to open

GROUP 2—SCREW OR LUG SEAL



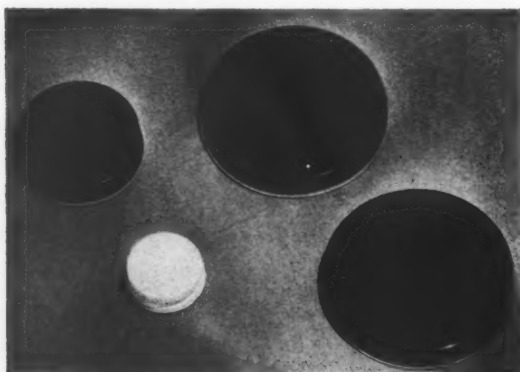
Left to right: Perforated (partial dome), rolled edge, no knurl. Flat, rolled edge, with knurl, depressed ring. Single perforation, rolled edge, knurled depressed ring



Left: Partly domed top, raw edge, semi-knurl. Center: Full dome, no knurl. Right: Standard dome, no knurl



Metal cap lined with flowed-in composition rubber or other suitable vacuum sealing gasket. Used for airtight and vacuum sealing of all types of food products



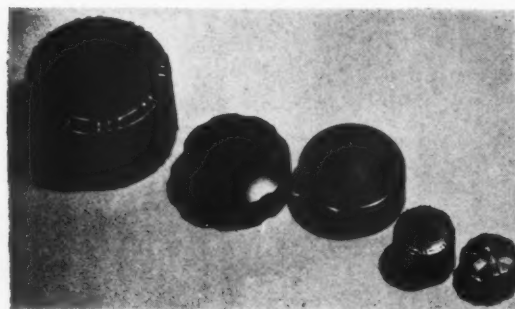
Upper left: Flat top, rolled edge, no knurl. Upper right: Flat top, rolled edge, with knurl. Below, left: Full dome top, rolled edge, knurl. Below, right: Flat top, no ring, no knurl. Used for a variety of products



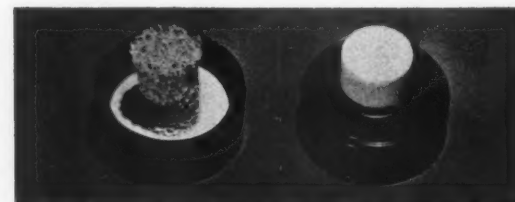
Upper left, Safedge snap cap. Used on tumblers principally for dairy products. Top and bottom of cap, at upper left. Lower right, lug cap



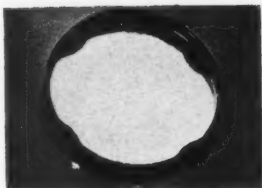
Flat top molded cap used for jars; continuous threads



Various types standard designs of molded bottle caps



Left: Molded cap with sponge applicator. Right: Molded cap with sprinkler opening and typical standard design screw top. Black and white show parts



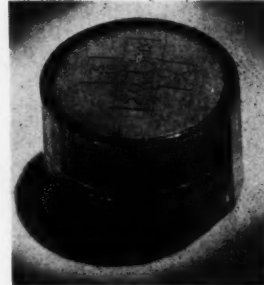
Anchor Beacon. Lug cap with smooth side or skirt



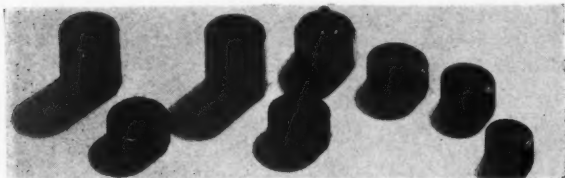
Ash tray top. Domed, single-shell, continuous-thread cap with printing on separate inside disc



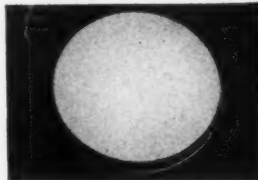
Domed top, decorated with a series of indentations



Transparent acid resistant decorative closure molded of polystyrene plastic



Various types of molded caps; shallow for pints and half-pints of liquor; deep-skirted for quarts and fifths. Center: Molded spout cap for dispensing hair tonics, lotions, etc.



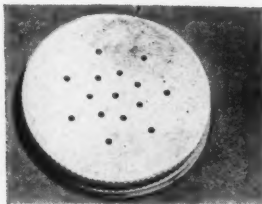
Anchor Amerseal. Lug cap with knurl. Used for food



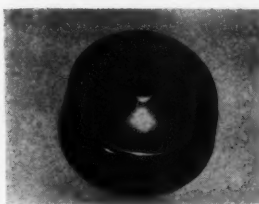
Molded plastic jigger caps with debossed trade mark; sealing type jigger cap and cover type for liquor



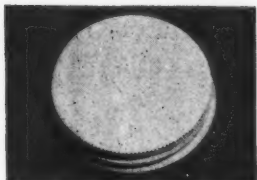
Partially domed top, rolled edge, with knurl, decorated



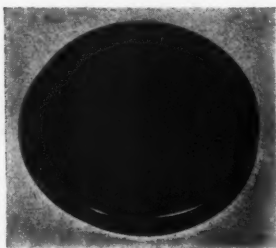
Perforated shakertop (flat), rolled edge, with knurl



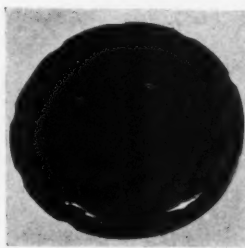
Molded plastic cap with single sprinkler opening



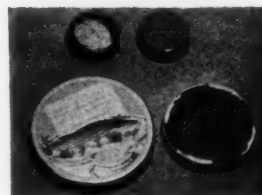
Deep screw cap with knurl



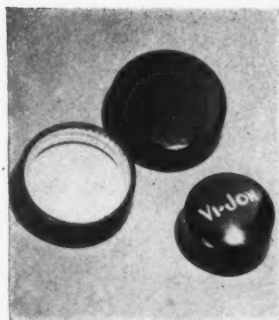
Double shell cap: Large standardized flat-top type



Domed top, with grooved side for finger grip to facilitate opening of jar



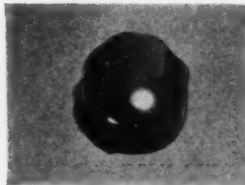
Top: Uniplex. Single-shell lug cap with smooth side or skirt. Under and top views. Bottom: Duplex, single-shell lug cap with smooth side or skirt



Left: Standard flat-top, double-shell cap, small size, showing under view with liner. Center: Upper view of cap. Right: Domed top short skirt closure



Double-shell cap of burnished brass with an extension dome. The upper and under views are shown



Domed top, with variable indentations which define a square. Generally referred to as a "square top"



Unishell in which screw thread is formed from curled-under edge so that the skirt is smooth. Decorated with brand name

GROUP 3—FORMED SEAL



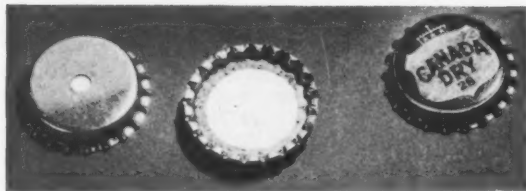
Dacro cap for milk, cream and fruit juice bottles



Saniseal cap. A tin-plate crown is lined with water-proof paper for demijohns and unlined for milk bottles



Left. Roll-on screw cap of aluminum; threads formed on the container itself

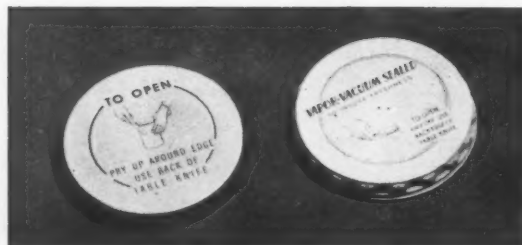


Crown caps, designed primarily for sealing carbonated water, beverages and bottled and canned beer

Right. Anchor T cap. Side seal; air-tight or vacuum



GROUP 4—VACUUM SEAL



Left: Whitecap vacuum side seal for pry-off finish. Right: Whitecap vacuum deep top seal for pry-off finish

Slip cover-cap for Mason jars, equipped with gasket



Top seal for thin, glass tumblers. Vacuum Whitecap



Anchor AH-N Side-seal vacuum cup with lift opener used with or without pry-off finish containers



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in closures—**

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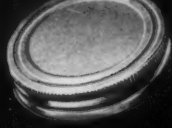
Deep Hook Thread
SCREW CAPS



VPO CAPS



MASON CAPS



LUG CAPS



One Piece VACUUM
CAPS



VENT CAPS



SHORT FRICTION
COVER CAPS



GROUP 5—COMBINATION TYPES

Dose-cup. Aluminum secondary seal. Affixed to top of bottle, over regular closure and held in place by screw thread. May be adapted for use as ordinary slip cover



Anchor Paragon two-piece catsup and chili sauce cap. Long skirt, screw type. Secondary seal



Cellulose cap or band (Cel-O-Seal). Fits over any type of closure and shrinks tightly to the bottle neck. Secondary seal



Filma-Seal (Primary Seal) of transparent type used in conjunction with a perforated screw cap. Seal preserves full strength of a spice while permitting use of convenience features embodied in the perforated screw cap used as a secondary seal



Top. Round lock top closure (divided thread) with inner paper seal crimped to container. Used extensively for coffee cans. *Bottom:* Round sifter cap for cans containing talcum and other dry free-flowing products



Canisters. Small aluminum tamper-proof cans with screw or plain re-closure



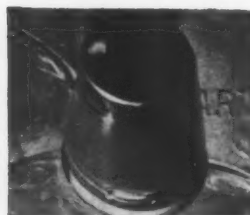
Open top, tamper-proof aluminum cap used when re-closure is not desired



Left: Cellulose cap or band (Wind - O - Band). *Right:* Viscose cap or band (Sylphseal). Effective type of self-sealing unit



Pull-strip cap. One-piece, tamper-proof cap made of aluminum. Opened by pulling weakened strip off in either direction



Pelican cap. Large tamper-proof aluminum seal over regular cork. Disengaged top serves as drinking or measuring cup



Left: Large lug cap with knurl, which is applicable to jars for many uses. *Right:* Filma-Seal paper type



Safety cork. Tamper-proof aluminum seal is placed over regular flange cork. The seal is broken by pulling weakened strip off in either direction



Break-away cap. Made of aluminum and threaded on the bottle. Breaks open as top is unscrewed while base is held in place on locating plug

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New Uses for CELONS

Material shortages caused by war have stimulated entirely new applications of CELONS. They are in use or under consideration by industries whose products require a complete, tightly sealed package of unusual toughness and strength; a combination cellulose and fibre, or cellulose and glass closure for glass containers; protection of parts against dirt or tampering, and many other uses prompted by American ingenuity.





Types of aluminum foil hoods designed for use on milk bottles



Decorative slip or friction cover-cap with long skirt



Alseco R-Overseal. A tamper-proof, tear-strip type for metal cans. It is used as a secondary seal



Hoods or capsules of metal foil which cover the top, stopper, and upper portion of the neck of the bottle



Upper left: Alseco foil tumbler cap. Crimped on. Also available in sifter (perforated) top. Upper center and right: Vacuum caps with tear-off tabs. Top seal may be provided with two tabs in aluminum or tin. Bottom: Goldy top seal. Tear-off type; aluminum; top seal



Screw and lug caps with patented slip rubber rings vulcanized into cap. These are two examples of closures used for vacuum seal and air-tight re-seal



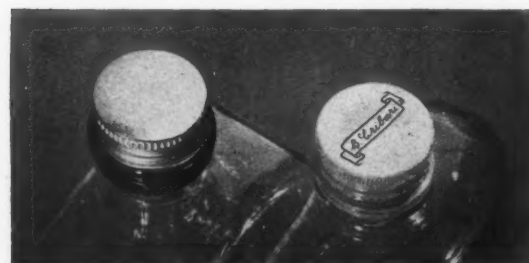
V. P. O. (vacuum pry-off) cap. Vacuum top seal for pry-off finish. Indentations in the side of the cap also provide a mechanical lock to hold it firmly in place. This type closure makes an air-tight and water-tight re-seal



Seal-Kap sanitary re-seal cover for milk bottles and jars. Made of specially treated paper, plain or decorated



Left: Whitecap double shell vacuum cap. Right: Band cap, two-piece vacuum. Band fastened by fold-over tabs



Left: Alter-proof seal. An aluminum two-piece cap for liquor bottles. Upper part is a single shell screw cap; the lower an indented band which must be broken before the top can be removed. Right: Aluminum piller-proof cap of a single-shell screw cap with perforated extended side. Closure is twisted to break band

RIGHT DRESS for wartime



**CEL-O-SEAL bands help new closures of many types
give complete protection to the contents**

TODAY, wartime conservation dictates the wisdom of guarding contents of all packages. CEL-O-SEAL cellulose bands give added protection . . . securely hold in place many types of package closures . . . paper, porcelain, plastic, glass, metal, rubber and cork.

CEL-O-SEAL bands effectively guard against evaporation, sampling, leakage. They balk substitution . . . keep strength, flavor and aroma in the pack-

age . . . keep impurities out. Food-stuffs retain original quality . . . medicines that protect health are themselves protected by CEL-O-SEAL.

For bottles with government strip stamps, a "Wind-O-Band" seal displays the stamp . . . holds it firmly in place after bottles are opened. E. I. du Pont de Nemours & Co. (Inc.), Cel-O-Seal Section, Empire State Bldg., New York City.



"CEL-O-SEAL"
REG. U. S. PAT. OFF.
BANDS

**Better Things for Better Living
. . . Through Chemistry**



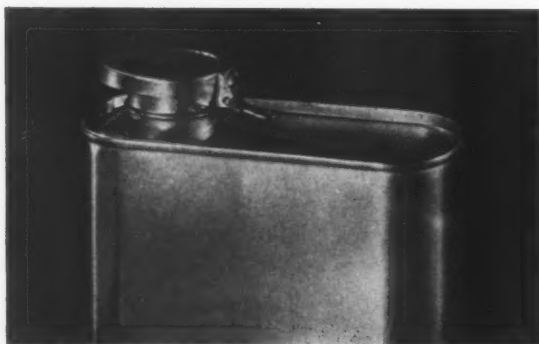
GROUP 6—MISCELLANEOUS



Sifter. Slide-dredge, for spice and condiment cans, metal or fibre



Premium type dispensing closure for thick, viscous fluids

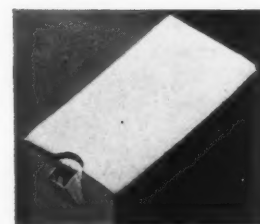


Left: Wing-nut closure for sealing cans containing ether, and the like. Right: Pouring spout, with screw tip, for small oil cans



Pour-N-Seal cap and nozzle closure for oval pouring spout

Seal spout. An aluminum pouring spout. Made in a variety of sizes and shapes and applicable to both cartons and fibre cans



Four dispensing closures incorporating a drop-pumping device with either a metal or plastic continuous thread closure. Plastic plunger closure may be obtained in colors



Left to right: Friction top, available with or without inner seal. Kork-N-Seal closure, wire clamping means and wire lever for opening cans. Available also for use with wide and narrow-mouth glass bottles



Dispensing type closures. Respectively, sprayer or atomizer, dispenser (continuous flow type) and dropper type dispenser. All these are of the "push-down" spring type



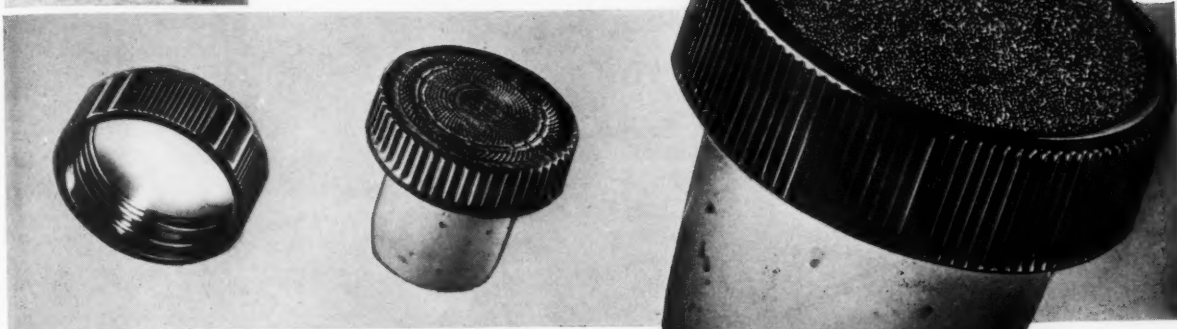
Left to right: U Press-It (inside pressure seal) with tear-off band. Newman closure, spun on. Pry off to open



Removing the outer bark from the cork oak tree. This is the raw product to be made into closures.



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New Types of Closures

THE perfect closure of the past depended on the three now highly critical materials—metal, plastics and rubber. Except for high priority products, comparatively few items of merchandise are now permitted to use any of these three. As a result, the past year has seen a frantic search for substitute materials.

The crown cap presents a most puzzling problem. Limitation orders have reduced the allowable quantities of metal for carbonated beverages and brewers, so everyone who has a cap to present finds "welcome" on the door mat. The problem has been complicated by the fact that the user must restrict himself to existing machinery and to the use of types of closure which can be applied economically on present packaging lines. That stipulation excludes many otherwise excellent suggestions. Tests are still being conducted by brewers and carbonators. The former will have a tougher time than the latter because of the pasteurizing process. This process lasts about 45 minutes, raises the temperature to approximately 150 deg. F. and increases the pressure to approximately 90 pounds—all of which has played havoc with plastic and fibre caps so far developed.

Better luck has been experienced in developing screw caps. A survey of the field reveals considerable experimental work in an effort to produce substitutes of paper, glass, ceramics and available plastics. Even cork and wood—at one time the only known closure materials—are being pulled back into service. Although several concerns report having abandoned projects that at one time looked very good, and others tell of direct war work interfering with closure production, the situation in certain directions is beginning to look very hopeful.

Paper closures that fit over a round edge glass jar have extended their usefulness in connection with quite a few products such as cleansing creams, jellies and processed cheese. These closures are made of bleached sulphite or molded fibre, treated so as to be grease-resistant and a seal is formed with wax.

A well-known brand of coffee is on the market with two different types of paper caps. One of these is a screw cap with a continuous thread which, it is claimed goes through the packaging line with no trouble, forms a tight seal on the jar and also has re-use possibilities. The other is a slip cap with a secondary closure of viscose to make a tight seal.

At least one successful paper lug cap is on the market. This is on a wide-mouthed tobacco jar and is made in two sizes. The same fabricator has developed a continuous-thread paper screw cap which is in successful use on a widely sold skin cream.

The glass manufacturers are playing around with closures mostly of the lid type, though some report success with screw, shell and lug types. The difficulty here lies in the need for a gasket. So far it seems to be

accepted that glass-to-glass cannot form a perfect seal. One glass container producer, whose lid type glass closure was a demonstrated success, found himself in a tough spot due to the rubber shortage. He has been trying various synthetic plastics, but at the latest writing has not found the successful one.

Ceramic closures are appearing which may solve the problem for some products. One company reports having successfully made screw caps of ceramic materials in sizes from 22 mm. to 89 mm. They claim to have eliminated the "grind" that commonly develops between container and cap. These caps are available either glazed or unglazed in about 60 different colors. Forming dies are readily procurable, they say, and costs do not vary for standard or non-standard sizes. They have advantages in color, texture and appearance as well as resistance to alcohol and acid—except hydrofluoric. The materials, of course, are non-critical, but ceramic caps are not inexpensive. They are suitable for high-priced products, and to that degree may release critical metals and plastics, but the makers of low-priced, low-margin products cannot regard them with much hope.

When plastics are mentioned for packaging the question should always be asked "which plastic?" The ureas, the phenols and the styrenes are all under restrictions for civilian packaging and the situation regarding their availability is unpredictable at any given moment. Acetate, which is less critical, is soluble in a variety of agents and, therefore, only suitable for grease-base products. Norepol, a synthetic rubber substitute developed from the soy bean by the Government laboratories, may prove suitable for closure gaskets and liners.

One company, in endeavoring to find substitutes for hard rubber compositions, has developed a composition of a powder molding characteristic, similar to the urea types. Basically, this material is composed either of the redwoods or hydrolyzed wood pulp. The material has been successfully molded in the laboratory and there have been some actual production tests in the field, but the problems are not all solved yet.

The supply of cork is much less critical than it has been. Probably the biggest user of cork for closures is the hard liquor industry but its consumption has been considerably reduced due to the fact that most of the distillers are devoting their entire capacity to alcohol production for direct war purposes.

Closures of wood are suitable for some products but most of them require some kind of a secondary seal. There are screw caps and stoppers of wood in existence but a difficulty seems to lie in securing uniform production and sometimes in preventing the "warp" characteristic of all woods. Another difficulty lies in the shortage of wood-turning capacity.

What's the Story on SEALING COMPOUNDS?

YESTERDAY AND TODAY — Before Pearl Harbor, sealing compounds were relatively easy for us to make. There was an abundance of materials in kind, quantity, and availability from which to choose, so that we could explore and test many compounds in our search for the ultimate best.

The outbreak of war superimposed new problems. With restricted sources of raw materials, the task became one of stretching the available supplies and at the same time obtaining stable sealing compounds that could be applied on existing equipment at normal speeds, while still giving the same effective protection to the finished package that American manufacturers have come to expect. The spade-work of yesterday gave us the "know-how" to meet the challenge.

How well we succeeded in the task is shown by the fact that wherever tinplate, steel, and rubber were permitted and a customer had lining equipment, sealing compounds have continuously been available to do the job (and do it effectively). At the same time we have saved in the last year approximately 1000 tons of rubber over the amount that would normally have been used when rubber was freely available.

Development has proceeded along three lines—to extend the rubber content of our sealing compounds, to make effective use of synthetic rubber, and to perfect the use of synthetic resins. In order to meet the urgent demands of commercial packing in cans and glass and of home canning in glass, low-rubber seals for process packs were developed. Non-rubber synthetic resin compounds have been produced for non-processed, dry, and dry-vacuum glass packs, as well as for steel containers for military purposes.

WHAT OF TOMORROW? — Since it is impossible to reduce the rubber content of our compounds still further without impairing the sealing factors of safety, our program is pursuing two lines of attack—the use of synthetic Buna rubbers and the improvement of non-rubber synthetic resins to make them capable of withstanding processing conditions.

Compounds for metal containers made from specially polymerized Buna rubbers have passed the commercial testing stage. Buna rubber cap compounds are showing sufficiently encouraging results to lead us to believe that safe, dependable sealing compounds for glass will be available when natural rubber can no longer be had. Likewise, progress with non-rubber synthetic resin cap compounds holds hope that, after further experience has been gathered, new fields for containers made entirely of non-critical materials may be opened up.

But just a word of caution on this outlook for tomorrow. The safe packaging of food is a sensitive operation, and the mere possession of a rubber-like material is not enough to make a successful sealing compound. We haven't rushed into your plants with new and untried products just because they looked promising, to waste both your time and ours. In spite of great pressure to "do something", experience has taught us the wisdom of methodical research and testing to see that each new development, whatever it may be, fills such requirements as these: Is the raw material readily obtainable? Can steel and equipment be had for manufacture? Can the sealing compound be applied in existing equipment at reasonable speeds? What are its storage and aging characteristics? Is it free from taste and odor? What kind of seal does it make under the full range of commercial conditions? Each of these questions must always have a satisfactory answer before we can feel ready to announce a "new" product.

In times like this everyone hesitates to make promises, but we confidently look forward this year to supplying our customers with adequate and effective sealing compounds for both military and important civilian needs.



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Closure Liners and Sealing Compounds

by J. B. Eisen

FACTS presented in this article are based entirely upon conditions as they exist in the packaging field as of the date of writing—they are, by no means, a statement or a prognostication of what they may be a week or a month hence; only the exigencies of the war can determine that. Yet, by no means is the picture as black as it may appear. We will probably not have to return to the early days of packaging—to the use of stone corks, animal skins and the like for containers; or to ground glass stoppers or twisted twigs for closures. But we may find ourselves returning to some of the methods and materials that existed (and successfully!) circa 1927, particularly as regards closure liners. The chemical and mechanical magic that has given us our pre-war niceties will be available only for certain high priority fields and then in restricted quantities.

In 1927, just as today, we had two major types of closure liners—backing liners and facing liners. For backing we had available pulp boards and felt boards, basically paper, waxed and unwaxed, as well as composition cork. They were available then—and to a large extent the paper boards are available now. With the pronouncement of War Production Board Order M-8, in May of 1941, and the sharp allocation of cork, there has been acute need for change in that category. Most recently, however, due to the careful manipulation and conservation of the cork stock pile, the critical stage of the cork position has lessened to some degree.

While the backings noted are efficient for their own purposes, they need a protection from the contents of the container, or vice versa, to avoid either absorption or chemical action. Hence came the need for facing liners.

In 1927 the following materials were available as facing liners: yellow oiled paper, black alkali-resistant paper, metal foils such as tin, aluminum and lead, wax coating on the backing, or heavy waxed paper liners (sulphite papers heavily coated on both sides with wax).

Yellow oiled paper varies in substance, depending upon the availability at any one time of such materials as linseed oil, tung oil or castor oil. Within only a few days of this writing, restrictions were somewhat eased on tung oil (once known as china-wood oil) and tightened on castor oil, though the conditions were reversed previously and may be so again. Linseed oil is generally available and is the basic material used in the coating. So, obviously, manufacturers of varnished paper will have to juggle their formulas to suit the immediate requirements. But generally speaking, this type of liner will be continually available with only slight variations.

Black alkali resistant paper is generally known and widely used, particularly in the pharmaceutical trade. It was developed especially for its alkali-resisting qualities in connection with packaging products such as milk of magnesia. It then became widely used in the trade for

other products. The asphaltic oil base derivative seems to be available in suitable quantities. This liner, during recent years, had been largely supplanted by a vinyl resin sheeting, not so much because of the greater chemical resistance of the vinyl resin, but also because it was white and its predecessor was black. This black paper also has a characteristic oily odor which was found objectionable when vinyl resin sheets (without odor) became available. It is possible that should more restrictions be placed on vinyl resins, the pharmaceutical packers will have to content themselves with black alkali paper with its characteristic odor and black appearance.

Metallic foil facings including aluminum, tin and lead are today on the high priorities lists as everyone knows. Tinfoil had been used in packing of pharmaceuticals and corrosive materials, particularly where solvents and chemicals were present which would have affected oil papers. Aluminum foils were, of course, widely popular, and lead, while suitable for some products, cannot be employed on closures when the products are to be taken internally or applied externally.

White waxed paper, known generally as "quality wax," was chiefly used for dry products to keep moisture out of the package, and it also found uses in mild alkali products and in aqueous solutions. This type of liner is still available and popular and may be expected to increase in usage if, as and when some of the other liners are restricted further.

Special liners developed after 1927

The first of the newer facing materials developed about 1927 was a varnished paper using cashew nut oil as the basic material of the varnish. This paper at the time it was presented was found to be the most chemically resistant of all paper liners and to a large degree replaced the black alkali paper in the general pharmaceutical field. It was particularly welcomed for its resistance to alcohol—said to be the best for that purpose which had been developed so far; also its resistance to acids and alkalis was relatively high. Today, however, this material is not available because all of the country's cashew nut oil has been frozen for the use of the Government.

Vinyl resin copolymer by its white appearance made a profound impression on the pharmaceutical trade. It was the first real white liner made available to the field and this alone gave it a great deal of favor, quickly becoming the most generally used item in the pharmaceutical and food fields as a general all-purpose liner facing. Naturally, it was not the Utopia, but it certainly filled more of the requirements of the field than any liner heretofore. It now is under restriction but is available for foods and pharmaceutical products in reasonable quantities.

Rubber hydrochloride sheeting which followed vinyl

THREE IMPORTANT SERVICES FOR WARTIME PACKAGING



1

METAL CONTAINERS FOR WAR—

Our longtime experience in producing metal vials and stampings for a multitude of peacetime uses stands our customers in good stead as a reliable source of supply for the metal containers needed for war.



2

PLASTIC SUBSTITUTES FOR METALS—

The pipe pipes, illustrated, suggest some of the possibilities of our plastics molding service in providing metal substitutes for items on the priority list. We work in all plastics, by compression and injection molding methods.



3

TIN AND LEAD COLLAPSIBLE TUBES (WAX COATED)—

For many products requiring the unsurpassed utility of metal collapsible tubes, we have adapted this basic container to the war situation, eliminating tin where possible and using it in thinner coatings with protective wax layers.

VICTOR

METAL PRODUCTS CORPORATION

196 DIAMOND STREET

BROOKLYN, NEW YORK

sheeting on the market, had an appearance quite similar to its predecessor, and hence had a favorable reception. In some cases the rubber hydrochloride was found to be even more suitable for the job than the vinyl product and the general acceptance was good. It is a generally purpose liner which had its place in the field although, again, there are places where other types of liner facings are preferable. Since, however, it is made with a *rubber* base and the rubber situation is most tense, this type of sheeting is not at present available to the closure field.

Cellophane was first used in the closure field in large quantities in 1929 and has been widely used since. Its resistance to hydrocarbon solvents is its strongest recommendation and it is being used today for sealing many products where such solutions are present. It is available today for food and health items only, where there is a particular need for this material as indicated by restrictions in Limitation Order L-20. Cellophane is also used in many places where tin-foil was previously used due to its resistance to solvent action.

Nitrate and acetate films have been used in the past but in relatively small quantities. They are continued in use today but confined sharply by a limitation order.

Plastic wax liners consisting of pulpboard with a heavy coating of plasticized wax, have been widely used in the past on food containers. From present indications their use is still possible in all quantities.

Some newly developed papers for special uses are available. These include lacquered glassines and papers coated with solutions of urea formaldehyde and various resins. These papers have their uses where normal oil papers would be soluble. They are available in limited quantities and should be used only where other types of papers are not suitable.

Glass fibre liners which have been used in limited

quantities are not now available except under special circumstances. Generally speaking, there is high priority on them and they may be used only for sealing of concentrated chemicals, particularly acids.

Sealing rings and compounds

The problem presented for sealing hot packed or sterilized materials involves the use of sealing compounds and rubber rings. However, under WPB Order M-104, dated January 1, 1943, the use of rubber sealing rings and sealing compounds is strictly limited for special fields and in specified quantities. Substitutes for such rings and compounds are now being developed; one firm, which appears to be farthest advanced in this respect, a Detroit organization, will probably have an announcement to make shortly.

In conclusion: There are a large number of firms using a variety of sizes of glass containers who find themselves confronted with the problem of using a half-dozen different types of liners because they cannot get a sufficient quantity of liners formerly used. The big problem for them is keeping a sufficient stock on hand of all these various sizes so that at any time they can pack the required number of containers desired. The wisest course for such packers would be to reduce the number and variety of their closure requirements by standardizing on very few sizes and types of glass jars, of sizes arranged so that the only variable factor would be the type of liner facing required (if any variety is required) thus assuring themselves of a steadier supply.

It may also be possible to tailor the liner to the product rather sharply and to reduce the size of the required cap to the smallest practicable size, which would give the effect desired and yet use as little vital material as possible.

Substitute Closure Liners

by E. C. Emanuel

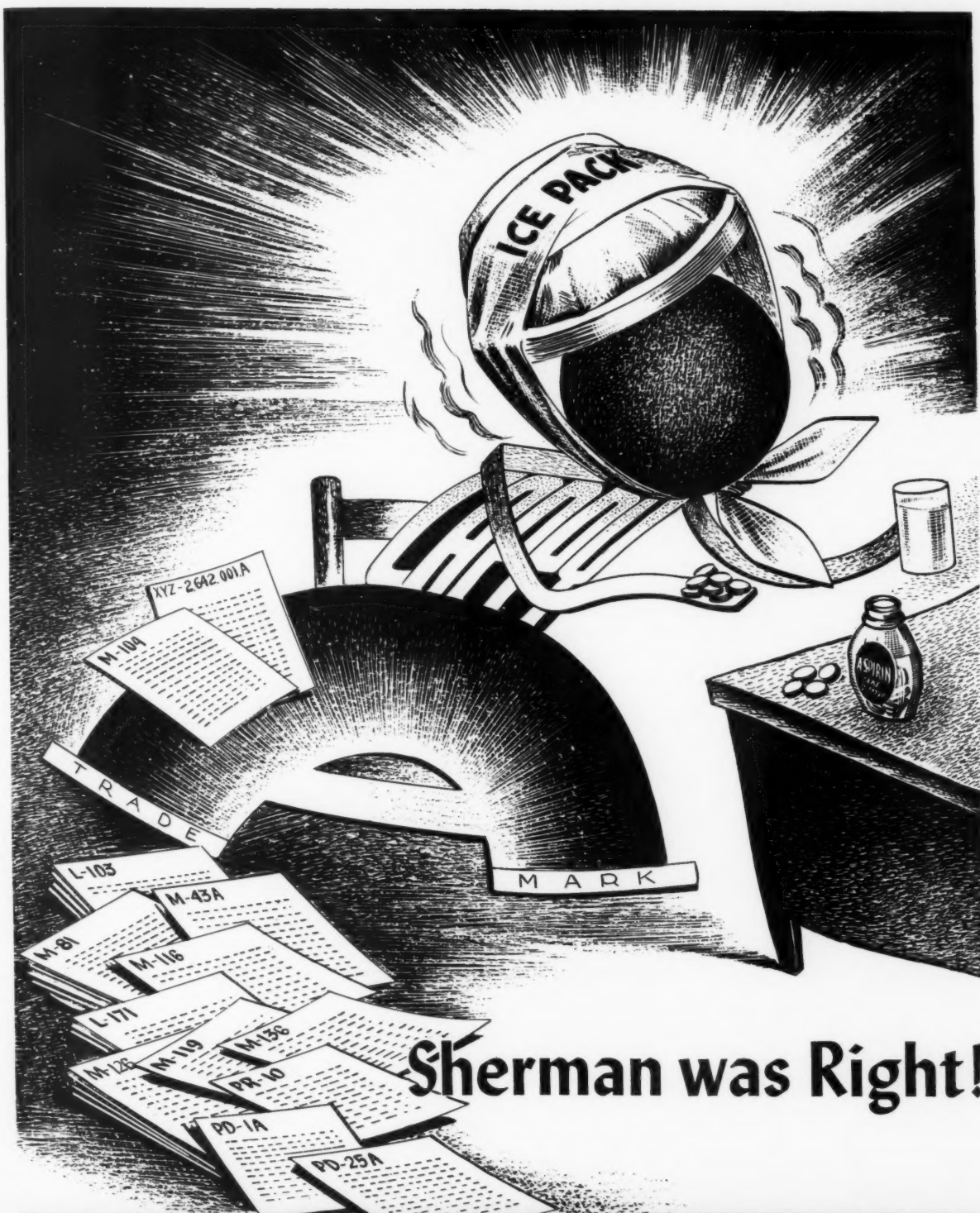
WITH the restrictions already placed on materials for liners and liner facings, the question of choice resolves itself to not "What is the best liner?" but "What liner can be procured?" Substitutes for the apportioned or eliminated foils, rubber, etc., are a matter of necessity and the outlook is not bright for satisfactory liners for all but essential pharmaceutical or food products. Therefore, those made from less critical materials must be utilized.

As a guide for the study of available liners which might be used, the following table will indicate a possible selection. Liners formerly used are indicated by the letter "F." However, it should be borne in mind that general recommendations for liners for such a broad classification of products as foods, pharmaceuticals, medicinals, etc., are not a sound practice. Because

of difference in formulation, each product should be subjected to proper laboratory tests before a substitute liner is used. The choice of a proper liner should be based on: (1) the reaction of the particular product to the facing; (2) the shelf life of the product; (3) the liners available. Cost in deference to quality should be the least consideration. The most expensive or best-looking liner is useless if it does not guard the product properly.

Classes of liners

Liners may be divided into two classes; namely, simple and duplexed. By simple liners is meant a liner of a single material, treated or untreated. A duplexed liner consists of a backing faced with a material which is resistant to the product, the backing being used to support the facing and to take up the space between the sealing



Sherman was Right!

The **ARIDOR** *Co.*
3428-40 WEST 48TH PLACE — CHICAGO

METAL CLOSURES FOR GLASS CONTAINERS

PACKAGING CATALOG 211

lip of the container and the closure so that a tight seal is made. The facing is most generally adhered to the backing material.

Simple Liners

Pulpboard	White Felt
White Waxed Paper	Waxed Saturated Pulp
Saturated Pulp	Plastic Wax
Natural Cork	Rubber (various types)
Cork Composition (various types)	Special Solvent (various types)

Duplexed Liners

<i>Backings</i>	<i>Facings</i>
News board	Waxed Paper
Pulpboard	Varnished Paper (various types, Silite, etc.)
Cork Composition	Vinylite
White Felt	Panaseal or Raolin
Tan Felt	Metallic Foils—Tin, Aluminum and lead
Gray Felt	

Plain pulpboard and white felt can be used for retaining products which are dry and non-hygroscopic. For powders, pills or capsules, which are only mildly hygroscopic, a white waxed paper, saturated pulp or waxed saturated pulp is indicated. Cork composition (either plain or waxed) will protect hygroscopic products, and

finds quite general use in the narrow-mouth package field. Rubber or rubber substitute liners are quite generally used for alkaline products, such as household ammonia, the hypochlorites, mild acids, tincture of iodine and cuticle remover. A pure gum rubber (minimum amount of free sulphur) is generally supplied for solutions to be used for injection purposes.

In addition, special liners have been developed which are resistant to solvents. They may be used in caps with posts or wells where a washer type of liner is indicated and are used on such products as corn cures, nail polish and solvent adhesives.

Duplexed liners

The duplexed liners consist of a backing and a facing and are the liners most generally used for closure purposes. The most common backings consist of pulpboard, newsboard or cork composition. In metal caps, double insertion is often used in which the backing and facing are not combined, but the superimposed materials are punched directly into the caps. In molded caps it is customary to adhere the facing to the backing with a tasteless, odorless adhesive.

Several different grades of cork composition can be supplied. Cork particles may be either large or small in size range and different degrees of resiliency may be produced by using dense or less dense compositions. The binders may be either protein or synthetic resin.

Suggestions for Liners or Facings

	Varnished Paper	Tinfoil	Silite White Seal Impervite	Vinylite	Panaseal Raolin	Waxed Paper	Rubber or Substitute	Special
Dry Powders	XF	..	X	F	F	XF	..	..
Mineral Acids:								
Concentrated	..	..	..	..	..	..	..	XF
Weak	..	..	..	?F	?F	..	..	..
Alkalies:								
Concentrated	..	..	..	..	..	..	X	..
Weak	..	..	..	?F	?F	..	X	..
Solid	..	..	..	?	?F	?	..	..
Alcohol:								
U. S. P.	X?	F	..	XF	F	..	..	..
Denatured	X?	F	X	XF	F	..	..	..
Bleaching Solution	..	..	..	XF	F	..	X	..
Adhesives:								
Liquid	X?	..	..	F	F	..	..	X
Solvent Type	..	F	X	..	..	..	..	..
Cosmetic Creams	X	..	..	F	F	?	..	..
Corn Cure	..	..	..	..	..	..	..	X
Foods:								
Dry	X	..	X	F	F	X	..	..
Olive	X	..	..	F	F	..	F	..
Relish	X	..	..	F	F	..	F	..
Mayonnaise	X	..	..	F	F	..	F	..
Processed	..	..	..	..	..	..	X	..
Liquor	X	F	?	F	F	..	..	..
Nail Polish	..	F	X	..	..	..	..	X
Nail Polish Remover	..	F	X	..	..	..	..	X
Oils:								
Animal	X	F	X	F	F	..	..	..
Mineral	X	F	X	F	F	..	..	..
Vegetable	X	F	X	F	F	..	..	..
Essential	..	F	X	..	..	..	..	X
Organic Solvents	..	F	X	..	..	..	..	X
Perfume and Toilet Water	?	F	X	..	..	..	..	..
Pharmaceuticals	?	?F	?	?F	F	..	..	..
Wine	X	..	..	F	F	..	?F	..

F—Formerly used.

X—Facing can be used with these products.

?—Liner probably can be used.

CANS, TUBES *and* VIALS

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Steel Containers in Wartime

by Dr. Edward L. Yordan

THE steel can has been drafted to package essential war products. Not only must it shoulder the gigantic task of packaging most foods for the armed forces, but it has a new and huge job as a container for scores of medical supplies and military products required by modern warfare.

Today, and until the war is won, it is essential that adequate supplies of canned food and other canned products continue to flow steadily out of American factories for transportation to the armed forces and for lease-lend shipments. For these war jobs the sturdy steel can is peculiarly suited. The repercussions of thundering guns or the explosions of bombs will not shatter or break a can under conditions where other containers would disintegrate. Poisonous gases cannot penetrate its sealed contents. It withstands rough handling in transport, extremes of weather conditions, and the thousand and one vicissitudes of a war fought on land and sea, in the air and under the sea, in deserts, tropical jungles and frozen steppes. It can be depended upon to deliver essential products in usable condition under the most unusual and difficult circumstances.

Cans in wartime

Since the last months of 1941 and increasingly during 1942 the fabrication of cans was restricted and directed into limited channels. This happened in World War I—it is happening today. The can fabricators and the

manufacturers who package their products in cans have cooperated fully with the Government in efforts toward conserving both tin and steel. Besides limiting production on a long list of cans for civilian products, reducing the number of can sizes and eliminating smaller cans, the can makers, in conjunction with steel manufacturers, have developed two additional new types of steel containers.

One is made from electrolytic tinplate, a new and revolutionary process of coating steel, with great uniformity and rapidity, by electrical attraction. Use of the electrolytic method permits application of a given amount of tin to an area two and one-half to three times greater than by the conventional "hot dip" method. The hot dip method of applying tin to steel requires normally 1.25 lb. to 1.50 lbs. of tin per base box of steel weighing 100 lbs. With the electrolytic method a satisfactory coating of tin can be applied by using 0.5 lb. coating per base box.

The other wartime steel container uses no tin. It is made from a steel plate chemically treated at the steel mill and shipped to the can manufacturing plants for enameling or lacquering before fabrication into containers. The enamel or lacquer provides added protection against corrosion and increases the packaging efficiency of the can for certain products.

The war, besides calling for billions of cans to preserve and transport food products for civilians, lend-lease and the armed forces, has called for vast quantities of special-



Food in cans comprises the mainstay of Army diet. Conservation Order No. M-86 was issued to assure adequate supplies of canned and processed foods to meet the needs of the Government. Canners were directed to set aside and hold subject to Government orders, certain percentages of each product. Photo by U. S. Army Signal Corp.

PROTECTED *by* CROWN



U. S. SIGNAL CORPS PHOTO 123820

THAT familiar phrase "Protected by Crown" takes on a new meaning!

For Crown has furnished and is supplying millions of canisters to hold the filter elements of gas masks for military, naval and civilian use.

"Protected by Crown" never meant more than it does in this case... a grim thing to think about... but an important part of the big wartime job that the Crown Can organization is doing!

Crown engineers designed and built much of the special machinery required to make these canisters... and brought to that task the skill and experience acquired in the production of Crown Cans for more ordinary... and more peaceful purposes.

CROWN CAN COMPANY, PHILADELPHIA, PA.
Division of Crown Cork and Seal Company



U. S. SIGNAL CORPS PHOTO 116591

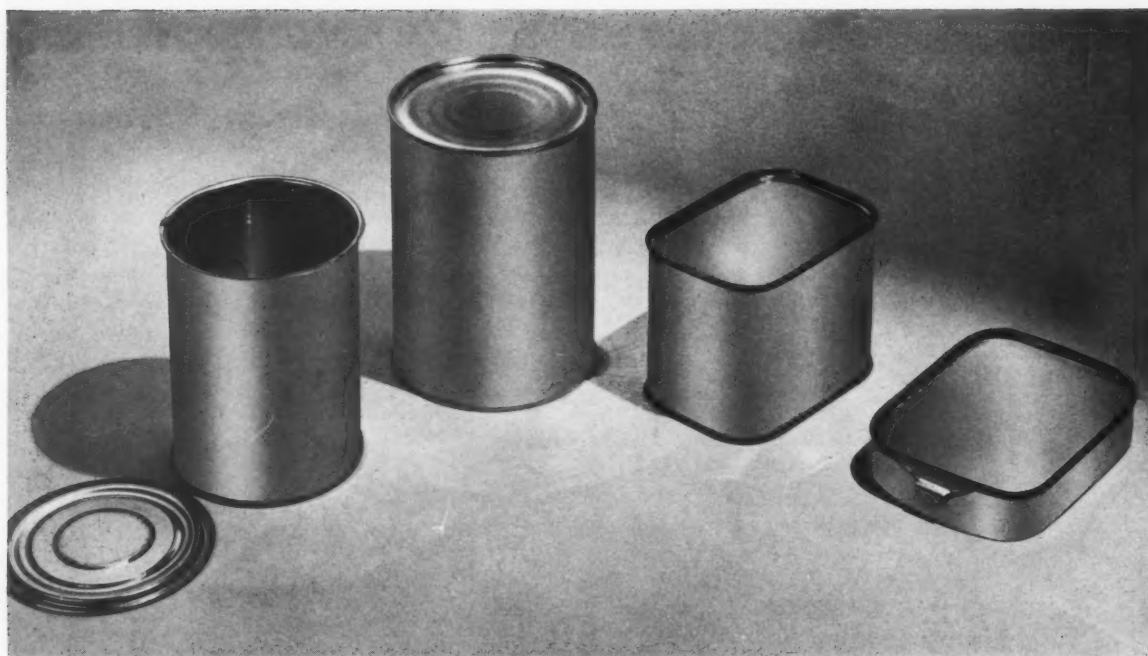
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CROWN CAN

PACKAGING CATALOG

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Cans for processed foods have been severely restricted to essential uses under Order M-81. At left, standard round can as supplied to the processor. At center, round can with top seamed on, ready for labeling. Right, rectangular can for asparagus, and flat rectangular key-opening can for sardines, etc.

ized steel containers for a hundred and one essential war supplies. Among them are containers for the following:

- First aid utensils
- Portable blood banks
- Emergency water supply
- Explosives and other powders
- Gasoline
- Lubricants
- Gas masks, gas detectors, detector paint and gas neutralizing chemicals
- Bombs of various types
- Depth bomb fuses
- Aircraft flares and signals
- Ground signals
- Spotting charges
- Anti-aircraft gun motors
- Goggles
- Impregnite

Fabricators of cans today are lending every effort to convert their production to the manufacture of special products for war use and are concentrating their plant capacities on the limited types of cans which have been selected as most vital to the nation's war effort. In addition, with the mounting pressure of priorities and scarcity of materials, they are helping packers to meet the difficult technical problems involved in war conversion.

The variety of can types and items packaged in cans prior to December 7, 1941, is no longer a guide to the can market. However, it is an important indication of the can industry's wide scope in normal times and of its

interrelationship to the entire canning business and to steel and other manufacturers.

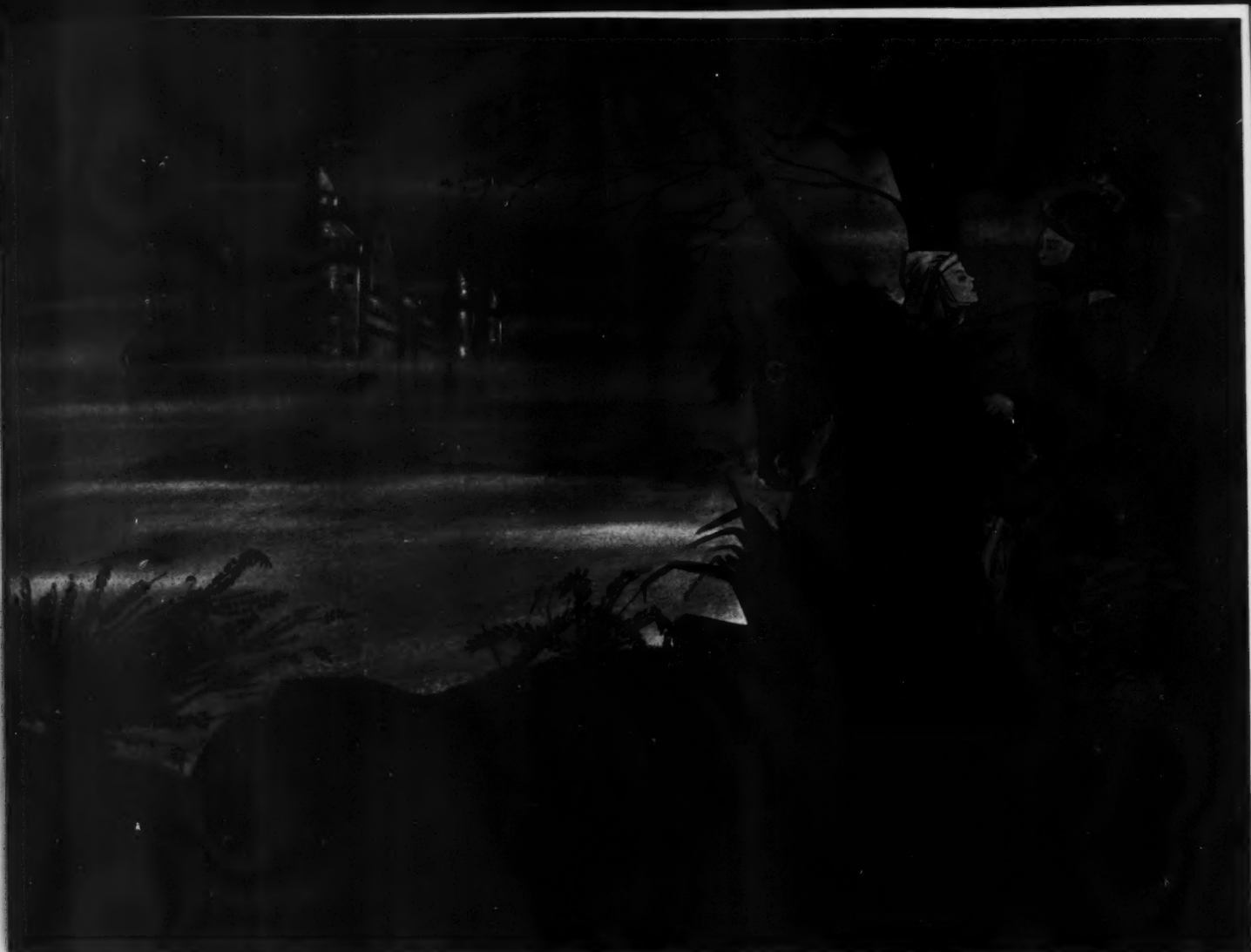
Functional classification of cans

Prior to war dislocations, a glance at the multiple products packaged in steel cans presented a complex and heterogeneous volume. However, analysis of the reasons why these products are packaged in cans and the functional uses of products so packaged reveals certain clear-cut, definite packaging patterns into which all cans may be classified.

Just as the food cans meet specific packaging requirements, so do the steel containers for special products; cans being selected in each classification for efficiency in meeting difficult and special product packaging requirements. Therefore, for classification purposes, all cans may be divided into two principal groups: (A) *food and beverage cans* and (B) *special product cans*.

In 1940, 80.4 per cent of the steel plate which went to can manufacturers was used for food and beverage cans and 19.6 per cent for non-food or special product cans. In 1941 the percentages varied only slightly, food and beverage cans taking 79.8 and special product cans 20.2. This four-to-one distribution of steel plate fabricated into food cans as compared with non-food cans emphasizes the steel industry's strategic position as a supplier of food containers and the interrelated interests of the can manufacturing industry and American food manufacturers.

The volume of food cans in 1941 was greater, by a large margin, than in the preceding year. This reflected the growing importance of cans in packaging foods to



Why did the best castles have round corners? (PACKAGING RIDDLE)

THERE was one big trouble with castles. The first ones were often square-cornered. They were supposed to protect what was inside. But they didn't. They couldn't.

No matter how many loopholes they had, there were always "blind" corners to block vision. Hostile troops could creep up unseen. Further, the stones at the corner were exposed on two sides. And that made them more vulnerable to battering rams.

Square-cornered castles just weren't safe enough! The package *had* to be improved.

New castles were built with round corners. In these circular walls, the loopholes let you see out at *every* angle. And in addition, the curved surface presented a greater obstacle to battering rams.

History books don't refer to the castle builders as "packaging experts." But they actually were. They improved their package to fit their needs.

Producing the right packages to fill America's needs today is the most important job Continental ever tackled. What these packages are, their size, or appearance is unimportant now. The significant thing is that government, like industry, has found that the tin container is an all-around, safe, economical package.

Looking into the future we see many new packages—ideas which must be held until another day. But, for those who are planning ahead, we offer the services of our packaging engineers, research men and designers. They will be glad to work with you.

CONTINENTAL CAN COMPANY

Packaging Headquarters for Industry



What will be the PACKAGE of the FUTURE?

The package of the future will be the package that best meets *all* these 10 important points:

1. Protects against light, heat, and dirt.
2. Does not chip, break, or tear.
3. Is adaptable to *highest* speed filling operations.
4. Is economical to pack, ship, and handle.
5. Light weight, compact, no waste space.
6. Moisture and vapor proof, impervious to temperature changes.
7. Easy and convenient to display, sell.
8. Available in wide variety of sizes, shapes, styles (over 500).
9. Offers maximum convenience and safety in consumer usage.
10. Permits high processing temperatures, certain hermetic sealing.

These points made the metal container *first* in packaging. If there ever is another package that has *all* these qualifications, we'll be making it!

meet the requirements of America's armed forces, the demands for increased food shipments to the other United Nations, and the building of a food reserve for home consumption and to feed the great masses of hungry people in the democracies. It is important to remember that the demand for food is not merely for the 130,000,000 in the United States, but also for other scores of millions in the United Nations outside our borders. By the close of 1942 foods and beverages were almost the only civilian products for which cans were available.

(A) Food and beverage cans

All foods and beverages are included in this classification regardless of whether the products are processed in the can, processed before packing, or unprocessed.

The list of foods and beverages packaged in steel containers in 1941 totaled 95 different kinds with more than 300 variations. During 1942, many of these foods were no longer packaged in cans except when such packaging was required to supply Government needs. This situation must be expected to continue under war conditions. Nevertheless, the necessity of preserving the nation's perishable food crops and the increasing percentage of canned food supplies required for the armed forces and lease-lend make the packaging job of the sturdy steel can even more important than in peacetime.



As every packer knows, the canning of foods has developed over a period exceeding a century, from the crudest experimentation to a precisely governed art. Today there exist for each commercially canned food exact knowledge and complete mechanical equipment, from the can factory through the filling, sealing, pressure-cooking and cooling plants. The net result of this complex art is that every canned product reaches the home kitchen not only completely prepared but retaining far higher nutrition values than is ordinarily possible with foods that have not been cooked in hermetically sealed containers. In consequence, Americans as a whole eat a greater volume and variety of high-quality food than any other people.

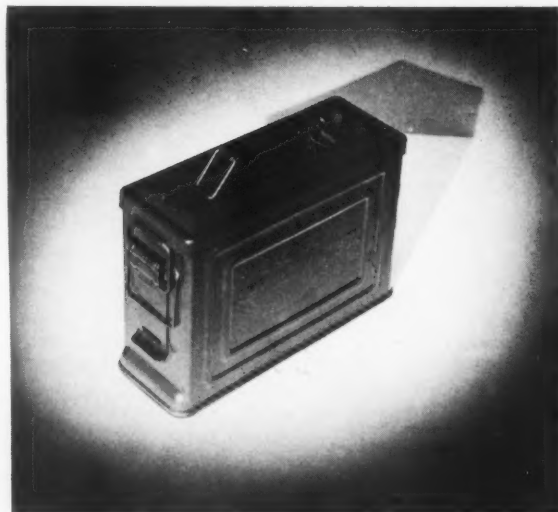
The technical research departments of the various can manufacturing companies have determined what type of inner surfacing is best suited to each kind of food. In these scientific laboratories, tests are constantly under way for improvement of old formulas and development of new ones—a type of research to which the war has given additional impetus. Food packaging technicians are concerned not only with problems of the container itself but with the diverse difficulties confronting those who prepare and pack the contents.

(B) Special product cans

Special product containers embrace those required for all products other than foods or beverages. Special product containers have a war job to do in the packaging of numerous products essential to the military effort and to the maintenance of civilian morale.

As indicated, the manufacture of special product cans normally requires the use of only one-fourth of the steel plate required for making food and beverage cans. However, the importance of special product containers in

Can manufacturers, in addition to supplying cans for essential processed foods are making metal containers for bullets which exemplify the conversion of modern packaging to the uses of modern warfare.



SUN TUBE CARRIES ON...

One part of our job—and a mighty important part—is the work we are doing for Uncle Sam. We've been assigned war contracts that call for skilled production, fast production—production that will help bring victory to our country.

But while some of our facilities are devoted to war work, we are still able to make and deliver Sun Tubes for dozens of everyday products—powders, liquids, jelly, tablets and pastes. We are still ready and willing to render the kind of packaging service that has made Sun Tubes the choice of America's best-known products.

If we can help solve your packaging problem—call on us. For Sun Tubes are convenient, economical, dependable. Promises of delivery are made to be kept. Write, phone or wire to Sun Tube Corporation, Hillside, New Jersey.

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CINCINNATI, OHIO
G. M. Lawrence
2428 Spring Grove Ave.

ST. LOUIS, MO.
M. P. Yates
315 Chestnut St. (Room 125)

ST. PAUL, MINN.
Alexander Seymour
903 Pioneer Bldg.

LOS ANGELES, CALIF.
R. G. F. Byington
1260 North Western Ave.

normal times cannot be judged alone by the steel tonnage consumed in their fabrication, for included in this group are the millions of small containers that hold a vital place in the distribution of civilian products. The elimination or curtailment of many of these containers is one of the war sacrifices of civilians and of those who package their products in metal cans.

For the purpose of simplification the hundreds of uses for containers and products fabricated by the can manufacturing industry have been grouped into eight categories in accordance with the use of such containers and products.

1. Special war needs. Many weapons of war and other "secret" Government products are included in this group. Actually, a great percentage of the special product containers in the other seven classifications are increasingly earmarked for Government needs. Under "Special War Needs" are listed five kinds of explosives, armament work, lubricants, and miscellaneous needs for round steel containers, as for radio coil sheets, fire extinguishers, anti-aircraft motor parts, flares and anti-dim sticks, flashlight tubes, and many others. (Some of these special war containers are listed above under the heading "*Cans in Wartime.*")

2. Construction and home repair. Before the war most of the products and containers under this heading were fabricated principally for the civilian market. However, war needs are creating increasing demands for construction materials, camouflage paints and the many repair and surfacing items for which steel cans are the preferred containers because of the volatility or similar qualities that make it difficult to package such items. In this group are included cans for cements, cleaners, creosote, surface and wood fillers and paints and varnishes.

3. Transportation and motor requirements. In 1940 one of the important packaging jobs for the steel can was the supplying of civilian products in this classification. During 1941, and since, the packaging of such items has become largely a service to the armed forces. In this classification are packages for anti-freeze, auto repair supplies, motor fuel, lubricating oils and lubricating grease. The current rationing of gasoline naturally has softened the impact on civilian drivers of package dislocations in the motor field.

4. Industrial requirements. Chemicals, both dry and liquid; alcohol; grinding, soldering and sealing compounds; fittings and trimmings; adhesives; wax; turpentine and asphalt are among the products packaged in this category of containers. Most of the items in this classification were, by the end of 1941, available only for industries having high priority ratings. The nature of the products, the importance of conserving such supplies and having them available when and where needed, present a packaging test best met by the sturdy steel can.

5. Products for maintenance of health. This classification includes containers for drugs, dental and first-aid supplies, soap, and surgical dressings and supplies. Before Pearl Harbor the packaging of such

products was largely a job designed to supply the needs and maintain the health of civilians. Today, the primary job of these cans is the packaging of medical and other supplies essential to maintaining the health of America's fighting forces. Secondary only to this, however, is the continued supplying of products important for civilian health and morale.

6. Agricultural necessities and farm products. Farmers have a war job to do in maintaining the food production of this country during the war. The Government has recognized the importance of this war job by giving priority ratings to products essential to agricultural production. Among the items grouped in this classification are stock and poultry food, disinfectants, livestock and poultry remedies, rodent and insect poisons and seed.

7. Home and personal commodities. Many of the items grouped in this classification are required for use by the armed forces. Some of these are considered important in the maintenance of civilian morale. However, even before the end of 1941 the manufacture of most of the containers and items included in this classification was being curtailed by the can manufacturing industry except for such products as were earmarked for Government requirements. Before defense and war curtailments restricted packaging materials, commodities in this classification included tobacco, powders and cosmetic preparations, polishes and cleaners, skin and hair creams, and bread, lunch, match and other types of household boxes.

8. Educational and miscellaneous products. Even in pre-war times, the use of steel plate in the manufacture of items included in this classification represented a very small tonnage in comparison to the variety and widespread utility of the products listed. Before the close of 1941 the manufacture of many of these containers, had been discontinued or limited. Among them are pencil, crayon, chalk, and diploma boxes, water color trays, pans and cups, and containers for tennis balls, phonograph needles and playing cards.

When peace comes. When restrictions are lifted and products are again flowing freely into civilian distribution, the highly efficient, low cost, dependable steel container developed by can manufacturers will aid packers in solving post-war adjustments and regaining the markets dislocated by the war.

While packaging interests are concerned with how to adjust to the dislocations of the war emergency and other manufacturers are worrying over how to market products in substitute containers, many package fabricators are giving thought to and preparing for a greater share of business in the post-war market. The long-term view is particularly significant for the can manufacturing industry, with its highly mechanized processes of manufacture and ability to produce immense volumes of containers. It is reasonable to believe that when adequate supplies of steel and tin are once more available in this country the can industry will be able to widen the distribution of its products and give full peacetime scope to its capabilities.

WE ARE PROUD OF OUR *Customers*



THE FACT that so many leading products are packaged in Peerless Tubes is an indication of what they may do for you. Whether you're launching a new item, or re-packing one already established, there's a Peerless tube in the proper material for the job.

Follow the leaders to Peerless Tubes. Write for samples.

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LOS ANGELES
W. I. Frost
4992-1/2 B Melrose Ave.

Schedules from WPB Conservation Order M-81

EXPLANATION OF SYMBOLS

CTB means Chemically Treated Blackplate.

SCMT means Specially Coated Manufacturers' Terneplate.

* means to use 0.50 tinplate to greatest possible extent.

** means to use chemically treated blackplate.

In all cases, No. 10 cans to be used whenever possible for packing Government's set-aside quota

Schedule I—Food Cans

Product	Can sizes	Tin Content	
		Body	Ends
Fruits and Fruit Products			
1. Apples, including crab apples. Whole apples not to be packed	10.....	1.25.....	1.25
2. Apple sauce, including sauce from crab apples	2-10.....	1.25.....	1.25
3. Apricots. Whole apricots not to be packed	2 1/2-10.....	1.25.....	1.25
4. Blackberries, black raspberries, boysenberries, loganberries and youngberries, when packed as berries	2-2 1/2-10.....	1.50.....	1.50
5. Blueberries or huckleberries	10.....	1.50.....	1.50
6. Cherries, other than white	2-2 1/2-10.....	1.50.....	1.50
7. Cherries, white.....	2-2 1/2-10.....	1.25.....	1.25
8. Fruit cocktail.....	2 1/2-10.....	1.25.....	1.25
9. Figs.....	10.....	1.25.....	1.25
10. Grapefruit segments.....	2.....	1.25.....	1.25
11. Grapefruit juice.....	2-3 cyl-10.....	1.25.....	1.25
12. Orange juice.....	2-3 cyl-10.....	1.25.....	1.25
13. Orange-grapefruit juice blend	2-3 cyl-10.....	1.25.....	1.25
14. Peaches (clingstone), halves, slices or cubes	2 1/2-10.....	1.25.....	1.25
15. Peaches (freestone), halves, slices or cubes. Not to be packed in California	2 1/2-10.....	1.25.....	1.25
16. Pears, halves, slices or cubes	2 1/2-10.....	1.25.....	1.25
17. Pineapple, slices, chunks, crushed or tidbits. Spears not to be packed	2-2 1/2-3 cyl-10.....	1.25.....	1.25
18. Pineapple juice.....	2-3 cyl-10.....	1.25.....	1.25
19. Plums, yellow or green.....	2 1/2-10.....	1.50.....	1.50
20. Prunes, fresh Italian. Not to be packed in California	2 1/2-10.....	1.50.....	1.50
21. Olives, ripe.....	2 1/2-10.....	1.25.....	1.25
Vegetables and Vegetable Products			
22. Asparagus, green. White asparagus not to be packed	2-2 1/2-10.....	1.25.....	1.25*
23. Beans, green or wax.....	2-2 1/2-10.....	1.25.....	1.25*
24. Fresh shelled beans, including lima beans	2-2 1/2-10.....	1.25*	1.25**
25. Beets, whole beets not to be packed	2-2 1/2-10.....	1.25.....	1.25*
26. Carrots, whole carrots not to be packed	2-2 1/2-10.....	1.25.....	1.25*
27. Corn, fresh, sweet, cut..	2-10-2 vacuum (307 x 306) for vacuum pack	1.25*.....	1.25**
28. Peas, green.....	2-10-2 vacuum (307 x 306) for vacuum pack	1.25*.....	1.25**
29. Pumpkin and squash.....	2 1/2-10.....	1.25.....	1.25*
30. Soups.....	1 picnic.....	1.25.....	1.25*
31. Spinach, and other green leafy vegetables limited to beet, collard, dandelion, kale, mustard, poke, and turnip greens	2 1/2-10.....	1.25.....	1.25*
32. Tomatoes.....	2-2 1/2-10.....	1.25.....	1.25
33. Tomato paste.....	2 1/2-10.....	1.25.....	1.25*
	5 gals. reusable..	1.25.....	1.25
	6 Z.....	1.25.....	1.25*

Product	Can sizes	Tin Content	
		Body	Ends
34. Tomato pulp or puree...	2-2 1/2-10.....	1.25.....	1.25*
	5 gal. reusable..	1.25.....	1.25
	1 picnic.....	1.25.....	1.25*
35. Tomato sauce.....	2-10.....	1.25.....	1.25*
	5 gal. reusable..	1.25.....	1.25
	8Z-1 picnic.....	1.25.....	1.25*
36. Tomato catsup.....	2 1/2-3 cyl-10.....	1.25.....	1.25*
37. Tomato juice.....	2-3 cyl-10.....	1.25.....	1.25*
NOTE.—When required for packing other products, tomato paste, tomato pulp or puree, tomato sauce, and tomato juice may be repacked from reusable cans, 5 gal. or larger.			
Fish and Shellfish			
<i>(Processed, and in hermetically sealed cans)</i>			
38. Clams, soft, hard, or razor	1/2 flat (307 x 201.25) — 1 picnic (211 x 400)—1 tall (301 x 411)—2 (307 x 409)—10 (603 x 700)	1.25*.....	1.25*
39. Crabmeat.....	1/2 flat (307 x 201.25)	1.25*.....	1.25*
40. Fish flakes. Dried fish flakes not to be packed	300 (300 x 407)—2 (307 x 409)	1.25*.....	1.25*
41. Fish livers and fish liver oils	5 gal. reusable..	1.25.....	1.25
42. Fish roe.....	300 (300 x 407).	1.25*.....	1.25*
43. Herring, Atlantic Sea, by whatever name known including sardines	3/4 drawn (304 x 508 x 105)—3/4 three piece (308 x 412 x 112)—300 (300 x 407) 1/4 drawn (300.5 x 404 x 014.5)	1.25*.....	1.25*
Packed in oil.....		1.25.....	1.25
Packed in mustard or tomato sauce		1.25.....	1.25
44. Herring, Pacific.....	1 tall (301 x 411)	1.25*.....	1.25*
45. Herring, river (alewives)	300 (300 x 407)—2 (307 x 409)	1.25*.....	1.25*
46. Mackerel.....	300 (300 x 407)	1.25*.....	1.25*
47. Menhaden.....	300 (300 x 407)	1.25*.....	1.25*
48. Mullet.....	300 (300 x 407)	1.25*.....	1.25*
49. Mussels.....	1 picnic (211 x 400)—2 (307 x 409)—10 (603 x 700)	1.25*.....	1.25*
50. Oysters.....	1 picnic (211 x 400) 1 tall (301 x 411)—2 (307 x 409)	1.25*.....	1.25*
51. Pilchards, by whatever name known including sardines	8Z short (211 x 300)—1/2 oblong (308 x 508 x 103)—300 (300 x 407)—1 oval (607 x 406 x 108)	1.25*.....	1.25*
Packed in oil.....		1.25.....	1.25
Packed in mustard or tomato sauce		1.25.....	1.25
52. Salmon.....	1/2 flat (307 x 200.25) (307 x 201.25)—1 flat (401 x 210.5) (401 x 211) 1 tall (301 x 411)	1.25.....	1.25*
53. Shad.....	300 (300 x 407)	1.25*.....	1.25*
54. Shrimp.....	1 picnic (211 x 400) 5 (502 x 510)	1.25*.....	1.25*
55. Squid.....	300 (300 x 407)	1.25*.....	1.25*
56. Tuna, bonito, and yellowtail	1/2 tuna (307 x 113)—1 tuna (401 x 205.5)—4 lb. tuna (603 x 408)	1.25*.....	1.25*

A black and white illustration of a scientist in a lab coat, holding a test tube and a flask, with various laboratory glassware and equipment around him. The scientist is depicted in profile, looking towards the left, holding a test tube in his right hand and a small flask in his left. He is wearing a lab coat and glasses. The background shows a window with a grid pattern. In the foreground, there is a large round-bottom flask on a stand, a beaker, and other laboratory glassware. The style is reminiscent of mid-20th-century scientific illustrations.

Plants — St. Louis, Missouri • New Orleans, Louisiana

DISTRICT OFFICES:								
	Los Angeles	San Francisco	Denver	Tampa	Chicago	Des Moines		
New Orleans	Boston	Detroit	Kansas City	St. Paul	Omaha	New York	Cincinnati	Cleveland
Oklahoma City	Pittsburgh	Memphis	Nashville	Dallas	Houston	Salt Lake City	Seattle	

Des Moines

Cleveland

Seattle

Plants — St. Louis, Missouri • New Orleans, Louisiana

DISTRICT OFFICES:								
	Los Angeles	San Francisco	Denver	Tampa	Chicago	Des Moines		
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Oklahoma City	Pittsburgh	Memphis	Nashville	Dallas	Houston	Salt Lake City	Seattle	

Des Moines

Cleveland

Seattle

Product	Can sizes	Tin Content	
		Body	Ends
Dairy Products			
57. Condensed milk.....	15 oz.....	1.25.....	1.25
58. Evaporated milk.....	10 (8 lb.).....	1.25.....	1.25
	6 oz.-14½ oz.....	1.25.....	1.25
Fish and Shellfish			
(For refrigerated shipment, fresh)			
59. Oysters. Until Apr. 30, 1943	1 gal.....	CTB.....	CTB

Schedule II—Food Cans

Meat and Meat Products (Processed, and in hermetically sealed cans)			
1. Bacon.....	14 lb.....	1.25*	1.25**
2. Beef, veal, mutton and pork; corned, roast or boiled, and containing not less than 85 per cent meat, by cooked weight. Cans with all seams soldered Cans with only side seams soldered	Any size..... Any size.....	1.25..... 1.25*	1.25..... 1.25**
3. Brains.....	10 1/2 oz.....	1.25*	1.25*
4. Meat products as follows:			
a. Chili con carne.....	300 (300 x 407)	1.25*	1.25*
b. Meat loaf.....	7 oz.....	1.25*	1.25**
c. Meat spreads.....	3 oz.....	1.25*	1.25**
d. Sausage in casings: Vienna sausage..... Sausage in oil, lard or rendered pork fat	4 oz..... No. 5.....	1.25*..... 1.25*	1.25**..... 1.25**
e. Bulk sausage meat	24 oz.....	1.25*.....	1.25**
f. Chopped luncheon meats	12 oz.....	1.25*.....	1.25**
g. Potted meat.....	3 1/4 oz.....	1.25*.....	1.25**
5. Tongue, whole.....	6 oz.....	1.25*.....	1.25**
6. Turkey, boned, and chicken, boned	1 lb.....	1.25*.....	1.25**
Miscellaneous Foods			
7. Baby foods:			
Liquid form.....	202 BF.....	1.50.....	1.50
Milk formulas and soybean milk liquid	14 1/2 oz.....	1.25.....	1.25
Milk formulas, dry or powdered	1 lb.....	0.50.....	CTB
8. Dehydrated vegetables..	10.....	0.50.....	CTB
	5 gal.....	0.50.....	0.50
9. Grape juice and grape pulp	5 gal. reusable..	1.50.....	1.50
10. Citrus pulp and citrus peel	5 gal. reusable..	1.25.....	1.25
11. Honey.....	60 lb. reusable..	1.25.....	1.25
12. Goat's milk.....	14 1/2 oz.....	1.25.....	1.25
13. Milk, skimmed, dry or powdered	50 lb.....	0.50.....	0.50
14. Milk, whole, dry, or powdered	1 lb.-2 1/2 lb.-5 lb.	0.50.....	0.50**
15. Special food products; limited to foods other than usual table foods. No person shall pack any special food product unless he packed the product in substantially the same form in 1942, and unless he obtains prior permission upon application to the War Production Board.			
16. Baking powder. Until June 30, 1943	6-oz. to 32-oz., inclusive	Fiber.....	Blackplate

Schedule III—Non-Food Cans

1. Abrasives, and grinding and buffing compounds. Not to be packed dry	Any size.....	Blackplate	Blackplate
2. Acid nitro-hydrochloric (outer container)	1 lb.....	Blackplate	Blackplate
3. Bee feeder cans, friction top, for use in shipping bees	2-2 1/2-3.....	0.50 tin...	CTB

Product	Can sizes	Tin Content	
		Body	Ends
4. Benzol, naphtha, toluene and xylene	1 gal.....	SCMT.....	Blackplate
5. Blood plasma.....	Any size.....	0.50 tin...	CTB
6. Calcium carbide.....	2 lb.-10 lb.....	Blackplate	Blackplate
7. Calcium cyanide.....	1 lb.-2 1/2 lb.....	SCMT.....	Blackplate
8. Calcium hypochlorite, Grade A	3 3/4 lb.-5 lb.....	SCMT.....	Blackplate
9. Carbon bisulfide.....	1 lb.....	SCMT.....	Blackplate
10. Cements and dressings, limited to belting, furnace, linoleum, pipe joint, and radiator. Not to be packed dry	1 qt.-1 gal.....	Blackplate	Blackplate
11. Cements, rubber, solvent or latex	1 qt.-1 gal.....	Blackplate	Blackplate
12. Chloropicrin, Bromacetone, Monochloroacetone, and acrolein	1 lb.....	SCMT.....	Blackplate
13. Chloroform and ether...	Any size.....	1.25 tin...	1.25 tin
14. Chromic acid (outer container)	1 lb.....	Blackplate	Blackplate
15. Fire extinguisher fluid, limited to chlorinated hydrocarbon type	1 qt.-1 gal.....	SCMT.....	SCMT
16. Gasket assembling compounds	1 qt.-1 gal.....	Blackplate	Blackplate
17. Glues and adhesives, liquid	1 qt.-1 gal.....	SCMT.....	SCMT
18. Grain fumigant, liquid..	1 gal.-5 gal.....	SCMT.....	SCMT
19. Graphite, with liquid content	1 qt.-1 gal.....	Blackplate	Blackplate
20. Greases, lubricating.....	10 lb.-25 lb.....	Blackplate	Blackplate
21. Inks, printing, duplicating and lithographing. Slip cover style cans of sizes based upon cans which hold the indicated weights of water	8 oz.-12 oz., 1 lb.-2 lb., 5 lb.-10 lb., 25 lb.-50 lb.	Blackplate	Blackplate
22. Lye. Until June 30, 1943	13 oz.....	Blackplate	Blackplate
22a. Drain cleaners, until June 30, 1943	12 oz.....	Blackplate	Blackplate
23. Toilet bowl cleaners. Until June 30, 1943	10 oz.....	Blackplate	Blackplate
24. Nicotine sulphate.....	5 lb.....	1.50 tin...	1.50 tin
25. Nitric acid, fuming (outer container)	1 lb.....	Blackplate	Blackplate
26. Oils, essential, distilled or cold pressed	1 qt.....	0.50 tin...	0.50 tin
27. Oils, transformer.....	5 gal.....	0.50 tin...	0.50 tin
28. Paints, copper bottom or antifouling	1 gal.....	1.25 tin...	1.25 tin
29. Paints. Pigmented oil or oleoresinous, ready mixed, semipaste and paste, including but not limited to white lead in oil, colors in oil, pigmented lacquers, resin emulsion paste, casein paste, and vegetable protein paste paints	1 gal..... 1 qt.....	Fibre..... Fibre.....	Blackplate Fibre bottom; blackplate ring. Plug made from waste blackplate recovered in manufacture of ends for 1-gal. fibre bodied paint cans.
30. Phosphorus.....	1 lb.....	SCMT.....	SCMT
31. Shoe polish, leather dressing, and saddle soap. Until June 30, 1943	Any size.....	Frozen blackplate and blackplate rejects.	
32. Soap, paste limited to mechanic's hand soap.	3-lb.....	Frozen blackplate and blackplate rejects.	
33. Sodium and potassium metals	1 lb.....	Blackplate	Blackplate
34. Sodium peroxide (outer container)	1 oz.....	Blackplate	Blackplate
35. Soldering pastes and boiler sealing compound	Any size.....	Blackplate	Blackplate
36. Dangerous chemicals, for shipment by Express, when a metal can is required by Interstate Commerce Commission Regulations and no alternate package is permitted.	Any size.....	Blackplate	Blackplate
37. Ointment and salve	1/4-oz., 1/2-oz., 1-oz.	Limited to frozen tinplate and frozen blackplate and blackplate rejects.	



Sealright



THE WORLD'S BEST-KNOWN PAPER FOOD CONTAINERS

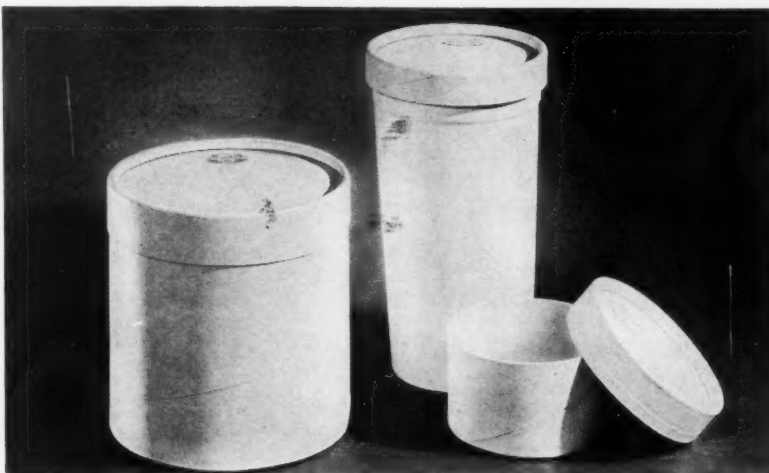
THE SEALRIGHT COMPANY manufactures cylindrical containers exclusively; no cartons, folding boxes or square packages. All Sealright containers are fabricated from paper board made in Sealright's own paper mill in Fulton, New York. Since the entire production is devoted to food packages, great emphasis is placed on sanitation. A modern laboratory staffed by trained bacteriologists supervises both paper making and each production step in the manufacturing of containers.

Sealright containers are available in many sizes and styles. The best known is the straight sided container. This container is made in capacities varying from 4 ounces to 10 pounds. A double-thick side wall and reinforced bottom make this container particularly sturdy and of excellent holding quality. The slip cover lid which is applied automatically in production fits securely and contributes considerable strength. The height of Sealright containers may be varied to meet particular requirements, bottom diameters are available only in 3 $\frac{3}{8}$ ", 3 $\frac{1}{2}$ ", 4 $\frac{1}{4}$ ", 5" and 6 $\frac{3}{4}$ " sizes. These containers are supplied in plain white or with a manila lined inside and kraft outside in sizes 1, 2, 3, 5 and 10 lbs. All containers except the latter may be decorated in from one to three colors by offset printing.

In addition to dairy products, this type of container is now being used for many other food products such as imitation jelly, glazed fruit, cracked eggs, marshmallow topping, bicarbonate of soda, pills and powders; also for products such as bath powders and chemical powders. Sealright containers are available with an extra coating of wax for products such as frozen vegetables, powdered eggs, powdered milk, powdered cheese, flour, preizels, mincemeat, cake mix and tobacco. On many laboratory tests, particularly for tobacco, Sealright heavy waxed round cans have shown an extremely low moisture loss.

NESTYLES, (Nested type containers)—

A popular variation of the Sealright container is the Nestyle container which, as its name implies, is made in a shape which permits nesting. An important appearance feature is that the Nestyle is made from a pure sulphite paper board producing a finished container of exceptional whiteness. This



style is made in two general shapes, tall and squat, in $\frac{1}{2}$ pint, 12 oz., pint and quart sizes.

The Nestyle is supplied with extra heavy waxing for products such as cottage cheese, etc. It may be decorated by the letterpress process of printing in from one to three colors.

The Nestyle is the only paper container made with the bumper roll top. This exclusive rim formation permits lids to be applied with greater ease and efficiency than any other type of cylindrical container. It is also effective from the standpoint of appearance, and may be packed more efficiently due to its nesting shape.

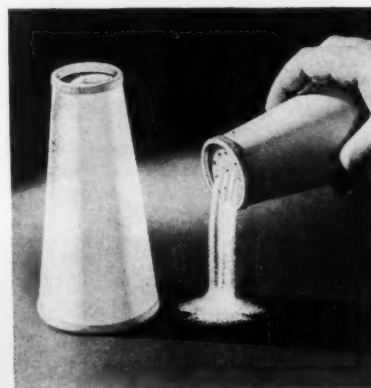
DISC-INSERTED LIDS, Cup type containers—

Sealright also manufactures an extensive line of cup-type paper containers, both squat and tall. The "tall" comes in sizes from 2 $\frac{1}{2}$ to 12 and 16 ounces. The "squat" is available from 3 to 12 and 16-ounce sizes. Practically all of these cups (excepting the 4.8, 6 and 7-ounce tall) have lid seats on the inside of the cup side-wall for inserting the disc cover. Although the smaller sizes of these cups (from 2 $\frac{1}{2}$ up to 7 ounces), have been used primarily for 5¢ and 10¢ servings of ice creams and sherbets, they may also be used for dehydrated foods, nuts, candy and other products of this type.

CONICAL TYPE CONTAINERS—Sealright conical type containers, originally developed for

the dairy industry, are now also of interest to packers of granular and liquid products of many kinds. The addition of an acetate perforated disc in the cap seat provides an ideal shaker package. Available in 8, 16 and 32-ounce sizes, these containers may also be printed in one to three colors.

FOR SPECIAL PURPOSES—Sealright containers may be adapted to special needs in a variety of ways, such as the addition of hand-formed or pre-formed bag liners, by wax-dipping filled containers, by cover-taping and by extra heavy waxing. Sealright's quarter century of experience in the paper container field is at your disposal in meeting special problems. A detailed manual on Sealright packaging will be mailed on request. Sealright Co., Inc., Fulton, N. Y.



PAPER CONTAINERS AND CLOSURES



The Sealright Seal of Sanitary Service has won public preference through 19 years of national advertising.

Fibre-bodied Cans

THE fibre can has been commandeered for a lot of jobs it never did before. Metal conservation orders have seen to that. But these same restrictive orders have also drastically limited the number of products which can use metal-end fibre cans. For example, conservation Order M-81 as revised March 12, 1943, mentions only two types of products permitted to use this form of package: baking powder, until June 30, 1943, up to 50 per cent of the volume of 1942 may be packed in fibre cans with ends of "frozen" blackplate and blackplate rejects. All paints, except certain special naval paints, if in gallon sizes, may use fibre cans with blackplate ends up to 35 per cent of the 1942 volume.

As a result, paint is appearing in all kinds of new packages, some of which may conceivably be permanent.

For direct war work, the fibre-bodied can is finding a multitude of uses. One of the most interesting is for individual shells which are packed in spiral wound fibre canisters with metal ends and telescope-type closure.

Lubricating oils in fibre cans are another war product. The nature of oil requires an interior protective coating. Lithographed or printed labels on the exterior make these new paper containers resemble the conventional metal lubricating oil can.

Selection of fibre

Because of the extensive variety of products to be packed, there can be no one standard body construction of fibre cans. Each specific product must be thoroughly analyzed and so must the fibre materials in which it is to be housed. Products that are hygroscopic, or that will deteriorate if exposed to humidity, are put into containers of moisture-proof material.

Types of fibre containers

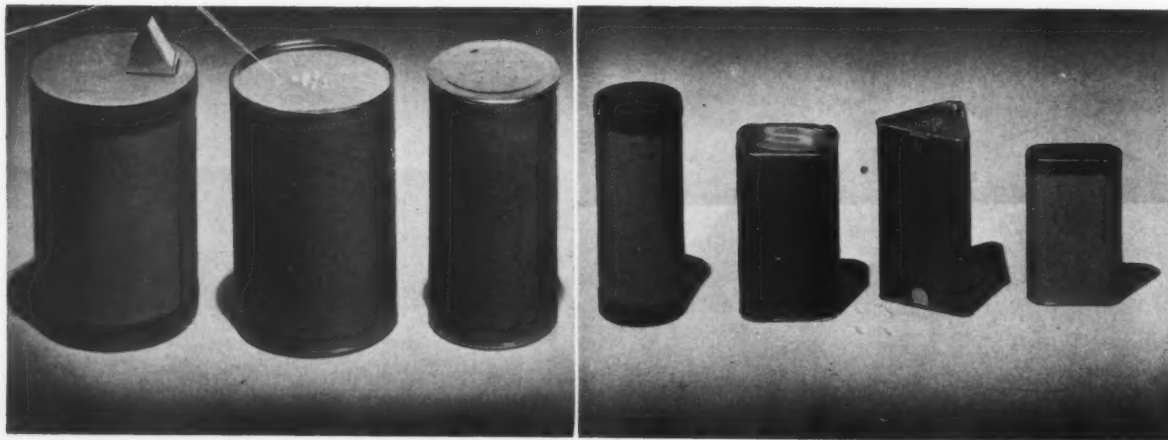
The fibre cans expressly used for dry products may be divided into nine distinct types, all of which are made in a wide variety of sizes and shapes. The physical construction of each type will vary somewhat, depending upon production considerations and equipment of the manufacturers. The following constitute the most popular types:

Paper cap cans: The fibre can with a paper cap is ordinarily limited, because of technical considerations, to cylindrical shapes, although a few oval cans have been introduced into the market. This type of can is constructed with fibreboard ends, or so-called paper caps. These ends are either removable or sealed on, depending upon the requirements of the user. The top end may be fitted with a pouring or sprinkling device for dispensing the contents. The caps are furnished in a variety of colors and, within limitations, may also be embossed or printed. Labels may be applied directly to the body of the can by the maker; or the user, after filling the container, may affix the label over the flange of the cap and thus seal the package.

Friction-plug-top cans: The friction-plug-top fibre cans with metal ends seamed onto the body are manufactured with round, oblong, oval or square bases. The plug is clamped securely in place by friction and can be pried loose without damage to the container.

Metal-slip-cover cans: The metal-slip-cover fibre can, which is made preferably on a small oval or round base, is an economical container for products requiring a full opening. If labels are to be applied over the flange after filling, the cover should have a raw edge; otherwise a curled flange is desirable.

Various shapes of fibre cans obtainable in normal times include round, square, oblong, triangular, obround and oval types. Metal or fibre ends may be devised with pouring spouts or punch-hole sifters. Treated bodies can be made moisture or greaseproof. Photo Sefton Fibre Can Co.



LUMARITH

REG. U. S. PAT. OFF.

Plastics

REPLACE TIN



THE PLASTICS "STORY OF THE YEAR"

LATE in the year 1942, plastics won another victory through intensive cooperation between plastic manufacturer and custom molder. In 1942, Celanese Celluloid Corporation perfected a Lumarith Plastic formula capable of replacing tin for collapsible tubes.

Everybody had expected it to be done some day. And perhaps it was natural to expect the material to be born in the laboratories of the founder of the plastics industry.

The first run of one hundred million tubes being made of Lumarith by

Celluplastic Corporation for Colgate, Chesebrough and Ortho Products, will save over two million pounds of pure tin.

With transparent Lumarith sheets and molded materials doing such important jobs as transparent cockpit enclosures, and molded parts for planes and gliders, lenses and molded parts for gas masks, there might be many votes for other stories as the Lumarith "story of the year." But the collapsible tube is used by so many people, in and out of uni-

form, every day, that most people will remember the tube made of Lumarith as the plastics "story of the year."

Celanese Celluloid Corporation, 180 Madison Ave., New York City, a division of Celanese Corporation of America Sole Producer of Celluloid* (cellulose nitrate plastics) . . . Lumarith* (cellulose acetate plastics) . . . Lumarith* E. C. (ethyl cellulose molding materials) . . .

*Trademarks Reg. U. S. Pat. Off.

The first Name in Plastics



A DIVISION OF CELANESE CORPORATION OF AMERICA

PACKAGING CATALOG

227

Interrupted-thread-cover cans: This so-called interrupted-thread device allows the cover to be easily removed by a slight twist of the hand, and yet when assembled, the container is securely locked. The full opening in the top allows easy access to the contents of the can. A drumhead seal may be affixed to the top.

Closed-top cans: This type of can makes a tamper-proof non-refillable package in that both the top and bottom are made of metal seamed onto the body. The top may, or may not, be fitted with revolving or push-slide dredges, pouring spouts, or semi-perforated knock-out holes. These containers make excellent packages for scouring powder, spices, birdseed, insecticide, etc.

Planetary-top cans: This can calls for a two-piece top, an under-cap crimped onto the body and a revolving over-cap, usually of some finished metal to provide a high-lustre end of striking appearance. The tops have a variety of sifter-hole arrangements, often carried out in some design motif.

Raised-neck-top cans: The top of this can consists of a raised neck assembled to the body of the can, perforated with single or multiple openings, depending upon the nature of the contents. This type of container is generally used for talcum or tooth powder.

All-fibre can fabricated on can-making equipment modified to handle fibre in sheet form by some process used to produce the familiar tin can. Photo American Can Co.



Telescope cans: Three interlocking sections are required in the manufacture of telescope cans: an inner tube and an upper and a lower outer tube. These fibre segments are fitted together so that the outer tubes act as closures for the inner tube. This package is used as a tamper-proof mailing case.

Screw-top cans: There are two styles of screw-top cans: on one the fibre body is threaded outside at the top; on the other type a threaded neck protrudes from a crimped-on body, to which the cover is assembled.

Spirally Wound Fibre Cans

The adaptability of the spirally wound fibre can is manifold since its construction allows the use of many different fibres and adhesives, thus serving the desired requirements of any number of products. In the manufacturing process, ribbons of fibre are wound around a steel mandrel, the diameter of which is the same as the inside diameter of the can to be produced. As these ribbons are wound on the mandrel at an angle, one over the other, and so placed that the top one overlaps the joint on the under ply, it is possible to produce a tube of any desired length and construction.

Since the original tube from which the bodies are made is composed of several individual ribbons, almost any combinations of materials—glassine, manila, kraft, straw chip, etc.—can be used, and a ply of any of these materials can be introduced at almost any place in the body, to meet the requirements for which the can is intended. For instance, a body can be produced with one ply of parchment paper, another of almost any thickness of fibre, and a third, of some different material, while the fourth ply may be a ribbon of colored paper, which, wound on the outside of the tube, would make a colored can. Since the adhesive is applied to each individual ribbon, almost any adhesive can be used for any particular ply of ribbon. Spirally wound cans can be made only with round bodies, because the ribbons of fibre must slip around the mandrel, but this characteristic has its merits, because it permits continuous production, at a high rate of speed, with a resultant low cost of manufacturing. After the bodies are wound into tubes (in some multiple of the length of the can being made), strip labels, i.e., multiples of single labels, are applied by hand and the cans are then cut to the proper or desired length.

Convolutely wound cans

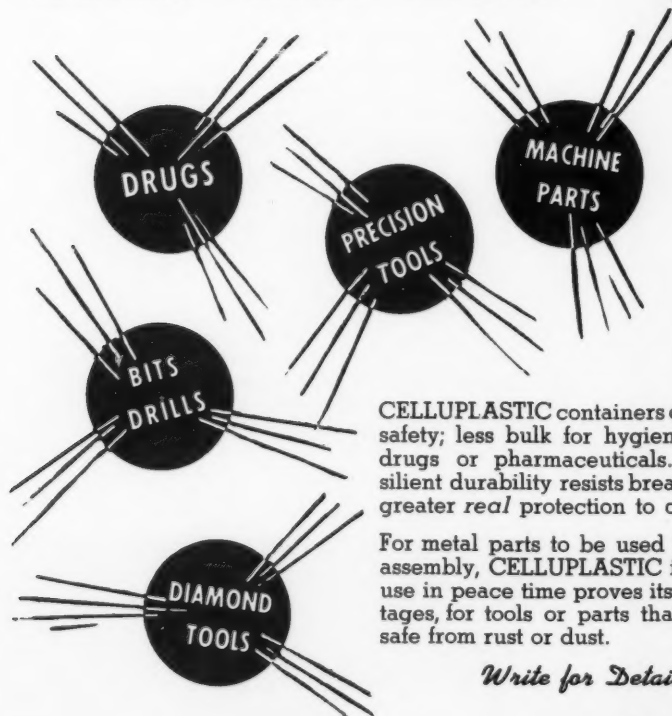
In the manufacture of the convolutely wound fibre can the ribbon is wound flush on a mandrel which revolves some required number of times and thus provides the necessary number of plies of fibre ribbon to complete the body. The ribbon is then automatically cut and the body moved along the mandrel to the position where the label is applied. During this second operation the body of the next can is being rolled. The completed body is then ejected from the mandrel, ready to receive its caps or ends which can be fibre or metal in a round body, but metal only in irregular shapes.

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PACKAGING CATALOG

229

Liquid-Tight Paper Containers

PERHAPS that term is slightly misleading. This type of container, originally developed to hold liquid and semi-liquid substances, has—during this era of shortages—been adapted to many other kinds of products, including even tobacco and shortening. New types have been developed, old types have been improved and numerous new applications initiated.



Cylindrical and slant-walled canisters are among the oldest type of liquid-holding paper containers. They are usually formed of a fine grade of bleached sulphite and are wax coated or otherwise treated to prevent absorption and penetration by water. The wax coating serves to stiffen the board to a substantial degree and this permits the effecting of a relatively tight seal by the use of die-cut paperboard closures which fit as friction plugs into the tops of the containers.

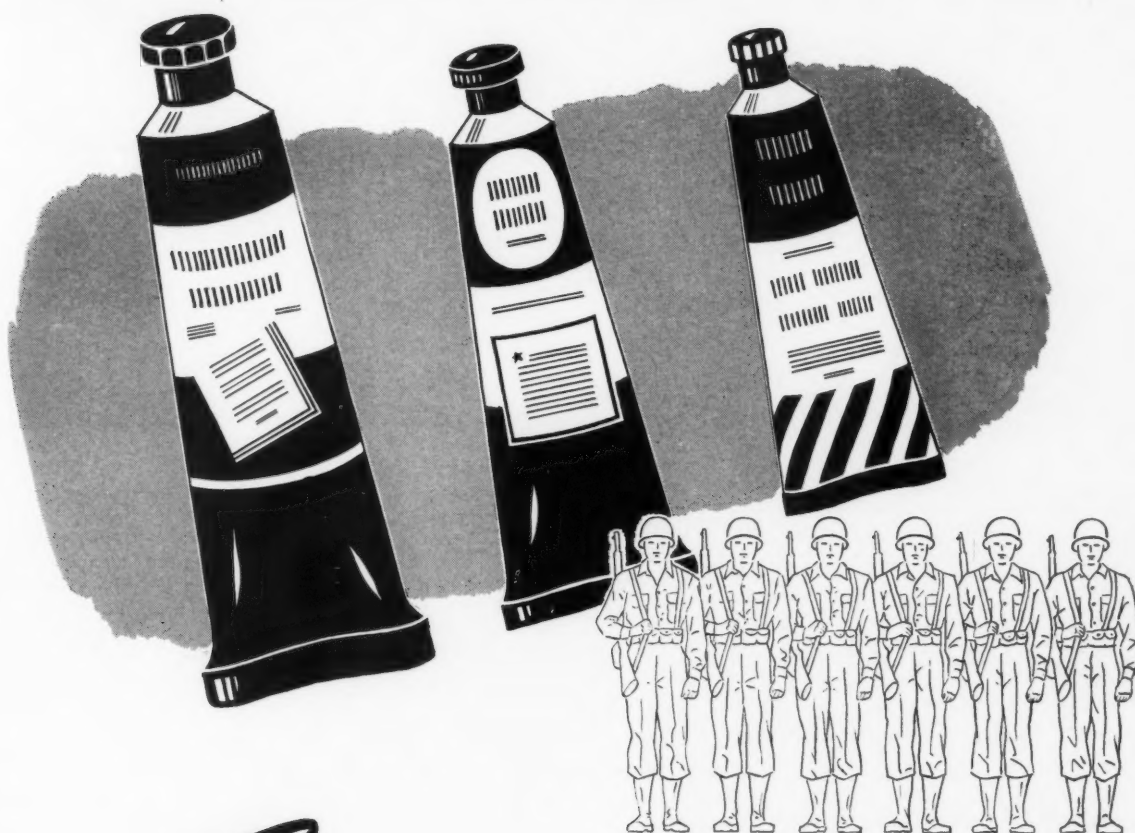
On cylindrical types, partially telescoping, overlapping lids are frequently utilized. One newly developed type utilizes slots, located slantwise in the side walls of these lids, to provide air vents which facilitate removal of the canister covers.

Pre-fabricated "bottles"

Developed originally for milk and cream and still largely restricted to this purpose are a number of types of so-called paper "bottles" pre-fabricated in boxmaking plants and shipped under sanitary conditions to the dairy where they are filled and re-sealed either on standard bottle filling equipment or—in the cases of some types—on special machinery. These containers vary widely in their structure, some assuming the form of truncated columns with metal inserts at the neck opening to provide rigidity and to permit of the use of plug-type paper closures. Others are rectangular in shape with tops and bottoms seamed to a formed side wall blank and with staple-attached closures.

1. Pre-fabricated rectangular "bottles" with stapled-on hinged paper closure. Photo American Can Co. 2. Conical pre-fabricated bottles with metal ring closure seats and paper closures. Photo Sutherland Paper Co. 3. Dairy products containers—styles in quart, pint, 12 oz. and half-pint sizes. Photo The Sealright Co.

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Endurance for the Duration

For strength, assurance and uniform high quality in easy dispensing of creams, pastes and liquids there has been no adequate substitute for the metal collapsible tube.

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When Victory is achieved, all our tubes will be available to all manufacturers once more.

NATIONAL COLLAPSIBLE TUBE CO.

Chicago ★ 362 Carpenter Street, PROVIDENCE, RHODE ISLAND ★ San Francisco



4



5



6

4. "Flight from tin" is exemplified in new shortening packages of the liquid tight types, reinforced for greaseproofness by cellophane. Photo Sutherland Paper Co. 5. One method of filling uses a mandrel to form the inner liner of cellophane. Photo The Sealright Co. 6. Pre-fabricated containers with snap covers for hot foods, liquids and semi-liquid products. Slanting side walls permit nesting for storage and shipment. Photo Lily-Tulip Cup Corp.

Bottle "blanks"

Other types of paper milk "bottles" are supplied to the dairy as flat blanks and are erected and sterilized immediately prior to filling. Here again, shapes vary from the cylinder with pleated top through the cone with flat metal closure to the rectangular type with slanting top and side walls and an integral closure opening.

Liquid-holding bags

The development of water-holding sheets, such as rubber hydrochloride, has permitted manufacturers of products of a liquid or semi-liquid nature and of products sold in brine to use water-tight bags as their containers. Such containers, in the smaller sizes, are sometimes used in the form of a bag alone with heat-sealed closure. Larger sizes, requiring a rigid form for merchandising appearance, shipability or structural strength, are usually placed in folding cartons. Several applications of this sort are shown in the accompanying illustrations. In some instances, the transparent water-tight sheet material is laminated for reinforcement and greater strength.

Sanitation requirements

Paperboard containers for food products are usually manufactured of board specially prepared in a way to insure against contamination. The coating process, involving immersion or spraying with hot wax or similar materials, acts as a further insurance in sanitation. Great care is exercised by manufacturers to protect the containers against contamination during shipment.

Decoration

Paperboard liquid-holding containers may be decorated in a colorful manner. Printing usually precedes the impregnating or coating operation. Wax coatings, of course, have an effect on the printing which must be allowed for in planning the design. The general effect is to soften tones and lighten them to a degree.

Paper container economies

Much controversy has existed, particularly in the milk field, over the relative economic desirability of glass containers as contrasted with paper containers. No clear-cut statement can be made since the relationship of costs varies with every dairy operation. In general, it may be said that the original cost of the paper bottle is less than that of the corresponding size of glass container. The cost per trip is a more debatable point, involving such factors as relative shipping costs, in view of weight differentials, bottle breakage, glass container cleaning costs, multiple trips of glass bottles as contrasted with single trips of paper containers, etc.



NO ONE coddles a collapsible tube! Hard-handed users squeeze and fold and squeeze again until it gives up the last portion of its contents, or until less sturdy tubes break down under the strain. No tolerance is given the product so unfortunate as to be packed in a defective or inferior tube. War's grim demand upon vital metals makes it more than ever necessary to choose collapsible tubes wisely. SHEFF-ALLOY Tubes, of the less critical metals... melted, tempered and toughened according to our exclusive "Sheffield Process"... are built to take punishment! ... to give more protection than the product ever needs! And coupled with our big series of over 50 "VINICOTE" Inner Coatings, practically any product of proper consistency can now be packaged in these convenient, well-liked, tough containers.

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Collapsible Metal Tubes

by William Rose

PACKAGERS using collapsible metal tubes should remember that the defense effort means government control of all basic metals necessary for armaments and defense. During 1941, the collapsible tube industry operated at almost maximum capacity, apparently because of the increased use of products packaged in tubes. During the same time, collapsible tubes made of aluminum virtually disappeared from the market and the use of tin tubes for shaving preparations, adhesives, and paints has been discontinued at the request of the Office of Production Management. During 1942, the necessity for conserving tin resulted in Conservation Order 115 which, with its amendments, wholly controls the manufacture of collapsible tubes.

Plastics for caps and facilities for molding them have become scarce. Certain pigments used in decorating tubes, cork for cap liners, lacquers, paper boxes and shipping cases, and other materials and requirements are all more or less restricted and rationed. This situation is, of course, not unique and is familiar, but the necessary changes in materials and techniques are important as they have a bearing on the future.

In accordance with some estimates of requirements,

aluminum will not be available for tubes for a long time. For various reasons, tin is the most suitable metal for packaging many products and, in the past, by far the largest proportion of tubes used has been made of this metal. The shortage of tin has made it necessary to substitute lead therefor and lead tubes, with suitable synthetic linings, have almost entirely replaced tin tubes.

The tube industry has for years had a substitute for tin tubes, used to some extent in this country and to a much greater extent in Europe, in the tin-coated lead tube, known also as "tin-plated," "tin-lined," "laminated" and "composite" to avoid calling attention to the fact that lead is the basic metal. More recently, tubes made of a tin-lead alloy have been used and these two substitutes, each of which provides a saving of about 70 per cent of the metal used in all-tin tubes, are the only metallic substitutes developed commercially which have proved to be satisfactory.

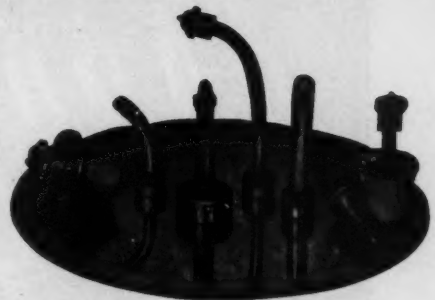
Many tubes using plastics, paper, or other basic materials have been invented, in the hope of finding one that can compete with the demonstrated qualities and economic advantages of metal tubes. Tubes of tin-coated lead or tin-lead alloy, if the nature of the packaged

Under current restrictive orders, few of the products illustrated may now be packed in collapsible tubes containing tin. Many producers, however, who are former users of this type of package, express their intention to return to it when shortages cease. Variety in sizes and many different kinds of closures make this a convenient method of packing. Photo Sun Tube Corp.



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Small tubes for ophthalmic salves or single dose sizes of headache powders are made with different types of closures. Photo New England Collapsible Tube Co.

product should require it, can be coated internally with inert materials to prevent chemical or electrolytic reaction between container and contents.

The approach to the use of substitute materials for tubes should be by way of exhaustive tests with the actual products to be packaged, particularly when essential oils are included in the formula. The responsibility for such tests should rest with the manufacturer of the product. His own self-interest should dictate the selection of both the particular metal and lining material, if any, best suited to his product.

The metal-substitute tubes are made according to the standards of the Collapsible Tube Manufacturers Association for standard tin tubes which have been in effect for many years. Decoration (labeling) is the same as heretofore, although shortages of the imported oils used in coating materials may affect their quality. To some extent, the use of metal caps may be dictated by necessity but, in all essentials, substitute tubes will retain the advantages of this type of container.

Classifications of tubes

Collapsible tubes may be classified in five general types, depending on the materials composing them.

1. Pure tin tubes: Made of new virgin tin, alloyed with a small amount of copper or other suitable stiffener, in minute quantities. No adulterant, such as lead or other soft metals, is used in these tubes and they are essentially for use for any product going on or in the human body. Included among these products were tooth-pastes, shaving creams, cosmetic creams, depilatories, contraceptives, ointments, food products, hand soaps, and pharmaceuticals.

2. Lead tubes (lead-alloy tubes): Made of lead alloyed with antimony or tin. They have been used almost entirely for non-personal products such as adhesives, shoe polishes, paints, colors, and grease.

3. Aluminum tubes: Made of pure aluminum, formerly replaced tin tubes to the extent of about 10 per cent of the total consumption. Because of the great chemical activity of aluminum, use of it was restricted to chemically neutral products until suitable vinyl com-

pounds, perhaps thirty in number, were developed for use as internal coatings.

4. Tin-coated lead tubes: A lead tube structure coated with thin layers of tin, inside or outside or both, which presents much the same appearance as tin and is less expensive. However, they have not been generally accepted as fulfilling the standards of quality set by manufacturers or by the public. In some cases, the combination of the two metals in the presence of an electrolyte—an alkaline product, for example—has resulted in electrolytic action detrimental to both product and container. Internal coatings have been perfected which have largely overcome this objection and, for the period of the emergency, tin-coated tubes have been approved for the packaging of shaving creams. This approval may be extended to other types of products.

5. Tin-lead alloy tubes: A recent development for which some advantages over tin-coated lead are claimed. The principal difference is the avoidance of electrolysis. Tubes of this type may be internally coated, as in the case of aluminum, and tin-coated, with equally good results. They are somewhat more costly than lead tubes, but compare favorably in price with other types.

Tube specifications

There is no great trick in drawing tube specifications. The dimensions are determined by the amount of product it is desired to pack or by the size of tubes used in similar price lines by established competing products. The size of the neck opening is, in large measure, determined by the plasticity of the product and the quantity ordinarily used in one application. Thus, "brushless" shaving creams are packed in tubes with large openings, ophthalmic ointments in tubes with pinhole tips.

Specifications for tubes require the following data:

- DIMENSIONS:** Diameter at the shoulder; length from shoulder to open end.
Size of neck or diameter of neck opening.
Wall thickness at shoulder.
- CAP:** Material and type of cap; type of liner.
- DECORATION:** Shoulder embossing, if any; coating and number of colors in printed matter.
- METAL:** Tin, tin-coated lead, lead or aluminum.

Design and decoration

The cylindrical shape of collapsible tubes is dictated by the method of manufacture and the method of closing and sealing. Possibilities of variation in structural design are, therefore, nil. Design enters into the appearance of the cap and the embossed decoration on the shoulder, but it is on the "label" or side that design has fullest opportunity. While the fixed cylindrical shape imposes certain limits, these are the only limitations. Label designs may be of any character capable of reproduction by zinc etching, photogravure, or halftone. Decoration may be printed or embossed and printed in from one to four colors on a white or tinted coating. By the use of process plates, additional tints can be secured. The brilliant metallic surfaces can also be produced on tubes with a high degree of fidelity.



R. C. SERVICE

R. C. CAN COMPANY

ST. LOUIS

Tube Restrictions and Substitutes

THE provisions of WPB's Conservation Order M-115, issued in revised form January 13, 1943, very drastically limited the use of collapsible tubes containing tin. For the purposes of this Order, tubes were divided into four classes:

(1) Non-essential tubes: that is, those for products not in any of the three following classes; they may contain no tin whatever, except the normal 0.5 per cent impurity.

(2) Class I tubes: that is, those for high priority medical supplies mainly for government use; they may be made without any restrictions as to tin content.

(3) Class II tubes: for medicinal and pharmaceutical products not in Class I; these may use blanks containing 7½ per cent of tin by weight.

(4) Class III tubes: for dental cleansing preparations, may contain 5 per cent of tin by weight until April 1, 1943, and thereafter 3 per cent.

This Order, first issued April 1, 1942, has been repeatedly amended and WPB has manifested its intention of working with users of collapsible tubes, particularly for the more essential end products. Efforts to find substitute collapsible tubes have been wide-spread and intensive. For some of these, premature and unwarranted claims have been made which have held out false hopes to users, produced many nuisance inquiries for suppliers and have not helped to improve the relations between the WPB and collapsible tube users.

Alternate materials

Up to the present writing, only one collapsible tube offered as a substitute for the familiar lead and tin tube has been placed on the market. This is made of cellulose acetate, and is a seamless cylinder extruded by a special method over a mandrel. The cylinder fits over a molded

cellulose acetate shoulder, or top, with a threaded cap. The shoulder is affixed with an adhesive to the extruded cylinder by a special process of heat and pressure which provides the seal. The bottom of the tube will be sealed by means of a mechanical folding and crimping, but metal clips will be used until a heat seal is perfected.

For grease-base products, this cellulose acetate tube does not require any interior coatings, but products with moisture content require very special interior coatings. This problem was solved by means of internal wax coatings varying in formula with the product content and applied at approximately 220°F. In appearance these acetate tubes look practically like their metal predecessors. The average purchaser would notice differences only of lighter weight and a little greater springiness when pressing out the contents.

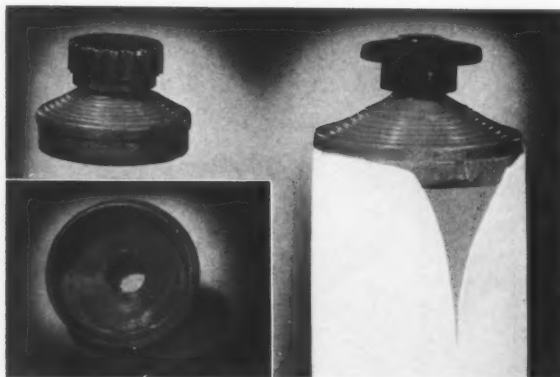
Another tube, of vinylidene chloride, has been developed as a result of collaboration between a tooth-paste manufacturer and a molder of plastics. This tube was no sooner brought to the attention of WPB than Uncle Sam told the molder he could make it, provided he would accept all the tube business the Government wanted to give him for medical ointments and ethical products with high priorities.

The walls of these tubes are extruded and the shoulder is injection-molded and the two welded together. The trick is to maintain uniform density and uniform wall thickness when extruding the material in continuous lengths. This is accomplished by ingenious and accurate temperature controls. The tooth-paste manufacturer has completed tests very satisfactorily, but up to the present writing there has been no announcement of commercial production for the civilian market. The material is not entirely odorless, but that feature, it is claimed, is easily removed either by proper aging or by washing the tubes in cold water.

Another form of collapsible tube slowly emerging from the development stages is one with a composite body either convolutely or spirally wound, with a one or two-piece shoulder. Claim is made that the paper or other sheeting can be coated or treated for adaptation to many different products. Each product would have its own particular coating. Orders for considerable quantities for tests over production lines and for consumer use have been placed, but up to the present time deliveries have not been made.

A two-piece shoulder construction is being used in fabricating a collapsible tube made of printed regenerated cellulose tubing. The chime is formed by shrinking the tube body over the shoulder where it is clamped into place by means of the top piece. This material is inherently greaseproof, but requires special coating for aqueous contents. Tubes of these types have been undergoing comprehensive tests, but are not as yet commercially launched.

Side walls of this tube are of extruded cellulose acetate affixed by adhesive, heat and pressure to injection molded cellulose acetate shoulder.



LABELS, SEALS, TAGS *and Marking Pieces*

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Labels, Seals, Tags and Marking Pieces

by Charles R. Cosby

It is now known that labeling was the first step in the art of writing. The earliest practice of the use of markings for the purpose of conveying intelligence was found among the excavations of Sumerian habitations in Mesopotamia. The communal life of these people, who lived nearly 5,000 years ago, has been placed by scientific research near the end of the so-called Uruk period, somewhere between the years 3500 and 2900 B.C.

The origin of labeling

The markings practiced by the Sumerians consisted of seals or cylinders bearing the peculiar and distinctive mark of the owner. These marks were the first assertions of property rights—they were the evidence of ownership. Naturally they were placed on objects of value which, as they passed from one generation to another or from hand to hand in exchange for other objects of value, became marks of authenticity. Their value as originals depended upon the honor and prestige of the mark.

As commerce and trade developed between nearby communities there was developed a medium of exchange or currency. The objects used for this purpose had an intrinsic value, expressed according to weight and fineness—a practice which established as currency familiar

pieces of metal or like substances bearing weight designations and the mark of the weigher. The validity of the piece, plus the mark of the issuer, spoke for themselves. It was not necessary to provide a name for the currency, although in the course of time, things began to have names, represented by certain marks which eventually became letters of the alphabet. The Phoenicians are credited with the invention of our present system of peculiar marks, which represent letters to us, but which merely represented familiar objects among the Phoenicians.

Commerce and the exchange of commodities made it necessary for goods to have marks of origin. Methods of packing made it necessary for containers to have marks of contents. That system was adopted for trade among dealers as distinguished from consumers. Measured by the yardstick of time and history, the art of packaging for consumer distribution is of very recent origin. Packaging has been made possible by utilizing one of the oldest methods of communicating human intelligence, namely, the marking of goods to establish identity and authenticity.

Within the memory of persons now living, it was the general practice to dispense goods from bulk into containers furnished by the customer. Such products as

Labels for food products, usually applied after processing, show a wide variety of treatment in color and design.



Bottles and jars containing food products or labeled to permit the transparent container to exhibit the appetizing character of the contents. An exception is the all-around meat sauce label in the center.



prunes, sugar, crackers, candy and other foodstuffs were wholesaled in bulk to retail dealers, who scooped, weighed and sometimes packaged each customer's order as and when wanted. In those days, time was something which everybody had plenty of, the neighborhood store was a comfortable spot in which to kill time and swap gossip and nobody was bothered with new-fangled notions about efficiency. Nevertheless, the enterprising jobber's salesman was smart enough to discover that he could write bigger orders if he always sold some paper bags with each lot of bulk prunes and each keg of hard candy. Even the storekeeper found that his spare time could be used to tie up packages in anticipation of the next day's sales. He noticed that every commodity has a natural order-size for consumer use. Moreover, he learned that the customer never did like the unsanitary appearance of bulk goods. The retailer was quite willing to let the wholesaler and manufacturer take the packaging job off his hands.

In the meantime the country was becoming more thickly populated and the retail outlets were vastly increasing in number. People began to read newspapers. The packages bearing brand names, aided and abetted by the force of advertising, began to make their way into the corner and cross-roads stores. Better and faster transportation enabled people to move about more freely in the exercise of their privilege of buying where they might choose. This freedom of movement of goods and people increased the play of competition and the need to restore the frankness and forthrightness which characterized the simple commerce of our forebears.

When the contents disappeared behind container walls it became necessary for the package markings to assume some responsibility for the concealed contents, their source, quality and quantity. It was inevitable that some goods taken on faith without inspection should turn out to be something less than was expected. Many causes of dissatisfaction arose. The opportunities for

fraud were numerous. At any rate, someone (the government) representing the public had to step in and say with authority: "Be honest and tell the whole truth regarding the contents of closed containers." Packaging and labeling thus arrived at their present state of mutual dependence and helpfulness. Thus the system of distribution evolved to the point where the label speaks for the qualities which the *uninformed* purchaser is expected to accept—label statements that cannot be verified by casual examination.

Correct labeling is a boon to the honest seller because it eliminates the deception and trickery of dishonest competitors, a course of dealing which would discredit all merchandising. The success of mass distribution and comfortable living must depend upon confidence in values. Busy buyers and consumers cannot take time to experiment or to match wits in a one-sided game.

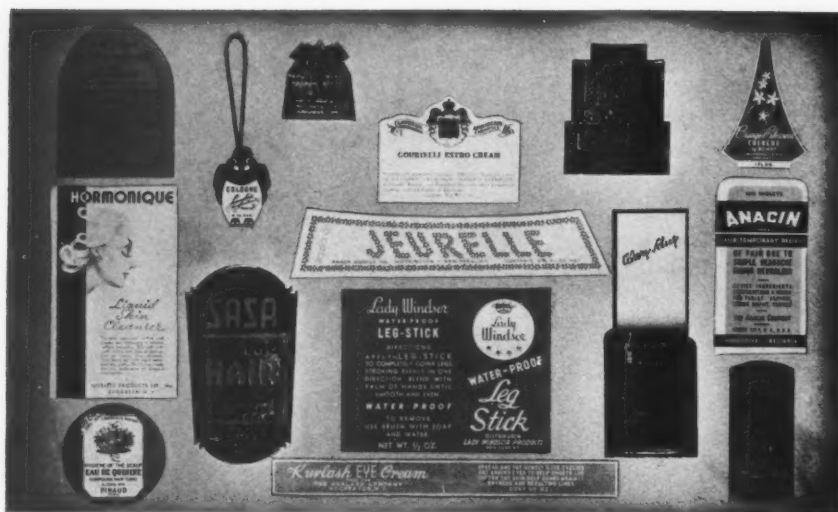
Classes of labeled articles

Types of labeled articles may be classified and subdivided into groups, although the border lines between classes are not clear and distinct. When does a package cease to be a package? One answer is, when the contents can be inspected without breaking the covering. However, "content" means something else in regard to a piece of fabric. The need for labeling begins at the point where the consumer is asked to take something on faith. Roughly, then, the classes of labeled articles are:

Closed containers, in which the contents are concealed (not inspectable):

Metal cans or glass jars are the most common containers for food products, especially fruits and vegetables, which are sterilized after being hermetically sealed. These containers must have sufficient strength to withstand the heat processing which is a part of the sterilization.

Cans and bottles are also popular for fruit and vegetable juices and for prepared soups.



Labels in the drug and cosmetic field may vary from the severely matter of fact to the colorful and brilliant, with die-cut shapes a common method of attaining striking individuality.

Bottles and jars are used for drugs, medicines, cosmetics, perfumes, etc.

Fibre cans are used for many dry products which do not require heat treatment for sterilizing purposes.

Set-up boxes use tight wrappers which also serve the purpose of a label.

Cartons may be labeled directly, or by means of labels which are pasted on the cartons.

Bags and other convenient receptacles for loose articles have the label imprinted on the bag or attached to the bag.

Wrapped pieces such as bars of candy and soap require labeling.

Boxes and shipping cases used for fresh fruits and vegetables are labeled with end strips or bands, and frequently contain advertising material.

Hermetically sealed packages of new types are being developed for dehydrated foods.

Unwrapped articles (inspectable) are labeled by attaching tags, tickets or marking pieces. In this category are: **Textiles and fabrics** which are sold by the piece with labels attached

Garments and other apparel, sold with paper or woven labels.

Tools are usually labeled with decalcomania or paste-on labels.

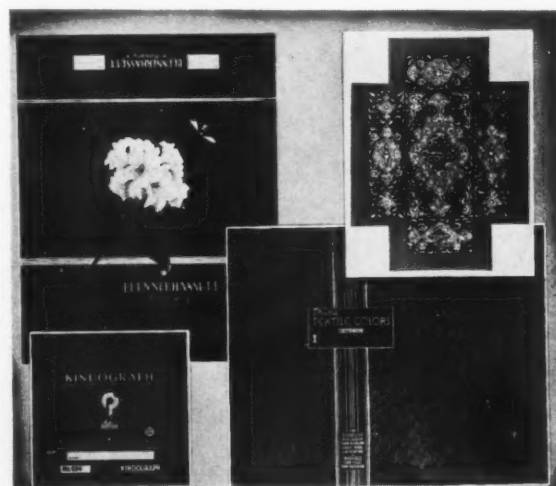
Equipment, utensils and appliances of many types are labeled with decalcomania or attached labels.

Folders or circulars which accompany articles at the time of sale are in the category of labels even though not attached to the articles. Even in cases where the circulars and the goods are shipped separately, the Supreme Court has held that the common origin and destination of both circular and product produces a situation which brings the circular within the definition of labeling. Both the Federal Trade Commission and the Food and Drug Administration would have concurrent jurisdiction.

Styles and varieties of labels are as numerous as the classes of objects to which the labels are attached. Paper is the favorite substance because its qualities can be readily adapted to various finishes and processes. Combinations of paper and metallic foils are capable of producing many interesting and artistic effects. Labels which use adhesives depend for their strength upon the rigidity of the surface to which they are affixed. Tag-boards and other strong grades of paper are used where the method of attachment requires a substantial body.

Labels for canned foods are usually of the wrap-around type. The ends of the label overlap and are pasted together by the operation of the labeling machine. The labels are held in position on the cans by a few spots of

Large labels on set-up boxes afford excellent opportunity for striking decorative effects at comparatively low cost. Attractive color printing makes full use of this opportunity.



glue, otherwise there is no adhesive between the label and the can. The flanges of the can may also serve to hold the label in position.

Labels for glass jars may be of the wrap-around type but the adhesive problem may be different, especially for narrow band labels which lack strength and protection against lateral thrusts.

Materials and processes

Closed containers. Can labels use special grades of paper, suitable for the particular purpose. The stiffness of the paper has a certain relationship to the direction of the grain, as well as the size and shape of the label. Papers that are to be varnished, embossed or otherwise treated by the graphic arts processes are selected because of their suitability for the purpose. No single kind of paper is best. These technical details are usually decided by consultation with the manufacturers of the labels and the labeling equipment. There should be proper coordination between all the factors that determine the success of the labeling.

Varnishing adds brilliance and permanence to a label, protecting it from soiling, and prolonging its effective life. Lacquering has a very definite place on certain types of labels. Spot varnishing is applied in the printing process.

Embossing is a form of bas-relief, one of the earliest methods of depicting the third dimension (perspective), and thus enhancing the artistic effect. One specialized

form of embossing is called "pebbling." At comparative low cost this process adds an interesting quality to the entire surface of a label which, in a measure, is of late compensating for lack of foils and fancy papers.

Food products which are expected to have appetite appeal are usually designed with a pictorial representation of the food in natural colors. To this is frequently added a picture of a combination of foods prepared from a recipe. Color photography, combined with the graphic arts (4-color) processes, enables the artist to obtain effects which markedly increase the sales-appeal.

Metallic inks and dusting powders are used to accentuate parts of the label design that are susceptible to such treatment.

Glass containers offer certain opportunities to display the actual contents, especially fancy fruits that are packed whole. Glass containers may use wrap-around bands or they may use spot labels. Different types of labeling machines are used for spot labels, which predominate on bottles and non-cylindrical glass containers. Spot labels use an adhesive over the entire surface next to the container. The adhesive is either applied by the labeling machine or by the use of pre-gummed paper. In using spot labels the quality of the adhesive is quite important, and the adhesive manufacturers have developed a wide range of special-purpose adhesives. On certain types of products and certain bottles, the objective is to stick the label for the term of its natural life, but on other bottles (beer and soft drinks) the ad-

The fresh fruit and vegetable container seldom goes to the ultimate consumer, but these labels on the ends of cases at least impress brand names on the retail merchant.





Textiles more and more are being branded and labeled, partly due to the impetus of the consumer's desire for information, and partly because the producer wants to register his brand on the consumer's consciousness.

hesive is expected to give up its job after one trip to the consumer.

Bottles that are collected and used again for the same product may have the entire label blown in the bottle, and certain processes have been devised for obtaining color and decorative effects permanently applied to the walls of the container.

Some products regularly use a combination of paper labeling and blown glass labeling; for example, bottles for distilled spirits are blown with the contents statement and the statutory federal legend but nevertheless use very artistic paper labels. It is possible to concentrate all the mandatory label requirements on the cap or closure of the container although it is not customary to waste any container space that can be used to sell the goods *and more goods*. Per square inch of display space, container walls are usually esteemed to be among the most valuable for advertising purposes.

Fresh fruits and vegetables are packed in boxes of various sizes and capacities, which containers are standardized by federal law. Many of the agricultural products themselves are standardized, and as such are permitted to be labeled with the letters "U. S." (Individual vegetables and fruits are frequently labeled to show the ranch or farm where grown. There is no doubt that such advertising helps to build up a demand from the public. When the consumer asks for goods by name, there is less difficulty in placing the product in the channels of trade.)

Tight-wrapped packages

Containers with cylindrical walls are strong, which is the reason why they are used to protect unstable contents. However, containers may have rectangular walls, in the case of tight-wrapped articles whose form and substance are adequate to withstand the trip from manufacturer to consumer. The fact that the wrapper

completely envelops the article and renders it *uninspectable* makes it "packaged goods," sold on faith, and therefore subject to labeling laws for the benefit of the innocent consumer.

The tight-wrapper of a set-up box is, or may be, its label. Of course the label could be on the box, just as it could be on a carton, provided the outer wrapper is transparent so as not to interfere with the legibility of the label. This would depend upon the availability of cellophane or other transparent wrapping material. Many tight-wrapped packages use specially designed papers. Candy bars and even chewing gums are in the category of packaged goods which are required by law to be labeled with a statement of the ingredients. Cartons and "shells" for cereal products are large users of tight-wrapped labels.

Seals

The seals that identified the Sumerian pottery, the Egyptian papyri and the edicts of the Middle Ages have set the style for the laboratory dignity of their modern forms. Although made by the graphic arts processes they retain an individuality that benefits the products to which they are attached. Label seals are usually embossed and die-cut to circular or oval shape; they make effective use of metalized papers or foil and they are often hand-embellished to produce elaborate artistic finishes. Gummed papers are often used for seals, in which event the particular kind of adhesive should be selected to suit the surfaces on which the labels are to be affixed. Seals are especially effective on jars and bottles for cosmetics and perfumes.

Decalcomania transfers

Decalcomania transfers are used for the reproduction of trade marks, brand names and other data upon packages of glass, metal, plastic or wood—any type of rigid con-

tainer, in fact, which permits either the product or the surface of the package to serve as a background for the lettering or the decoration. This process of applying transparent labels to containers permits the use of a great number of colors and the attainment of highly decorative effects. Once properly applied, a decalomania becomes a permanent part of the surface, withstanding cleaning and considerable wear.

Transparent labels

The effects of a transparent label may be achieved on rigid containers and displays made of cellulose acetate or nitrate. The sheet of material is printed or stamped from roll leaf while flat and then fabricated into a three-dimensional container. If the printing is designed without a background, the transparent label becomes an integral part of the container.

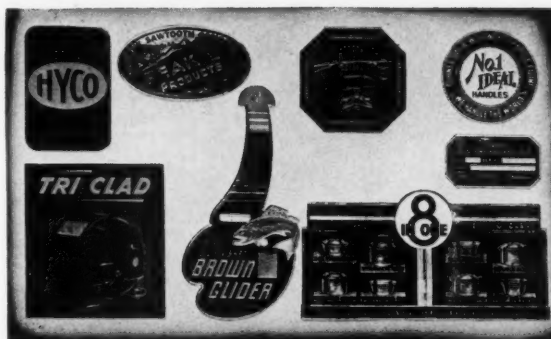
Labels may be printed on sheets of cellulose film which is backed with a suitable adhesive to make it adhere closely to the walls of a glass or plastic container. Since the carrying material is thin and transparent, the type and decorative matter seem to be applied directly to the surface of the container. When such printing is applied in reverse to the rear surface of the cellulose material, the label becomes impervious to stains, water, grease, etc. Such labels may be successfully applied to glass, plastics, metal, wood, rigid transparent cellulose, and non-absorbent papers of all types. Patents are claimed for this process.

Glass labels

Decorative labeling effects of high order can be obtained through the direct application of color to glass containers. This treatment, at first restricted largely to dairy and food products, is now used in the cosmetic, pharmaceutical and proprietary fields. Fused-in colors are applied by the manufacturer of the container and are a part of the package itself. Since the fused-in label becomes virtually an integral part of the container, counterfeiting of the product when packaged in such a manner is practically impossible.

Fibre cans

Different types of containers require different label treatment. Fibre cans are made with cylindrical walls and metal ends for dry powders and are even used as the outer protection of inside containers of viscous liquids in the non-food class. These fibre containers are not intended to be used for products that receive heat sterilization in the containers. However, recent developments in plastic or semi-plastic container walls have greatly enlarged the scope and promise of such containers. Fibre cans may be labeled during the process of manufacture of the cans, in which event the metal ends of the cans are crimped over the edges of the label. The dimensions of such labels are therefore a matter to be considered before ordering the labels sent to the can manufacturer. If the labels are to be attached by a labeling machine *after the cans have been manufactured*, they will have a different set of dimensions.



Above: labels for durable goods—die-cut, embossed and metal-like, give air of permanence.
Below: beverage labels must resist water action.

Decorated metal*

Many specialties are packed in decorated metal canisters (now called "cans," for short) if the prospective use and volume distribution of such containers can be considered permanent and readily anticipated. However, food products which are subject to seasonal variations in quantity, grade and geographical distribution find it more convenient to adjust quantities through the use of paper labels. Stocks of cans are therefore blank until the season's crops and destinations are known. Many canned foods are stored, unlabeled, until purchased by dealers who furnish the labels for their private brands. Among the products packed in lithographed cans, coffee has been a conspicuous example.

Informative tags

Utensils, appliances, tools, implements and equipment are labeled with *informative* tags or attached labels, because the article will give better service if its suitability is fully explained before it is selected by the prospective purchaser. Mere sales talk is never so convincing as the manufacturer's written claims, even if the salesperson

* Lithographing directly on metal has been forbidden by WPB order for the duration of the war.



Seals, oldest form of label, appear in modern form on a diversity of products in many colors and shapes.

is fully competent to conduct the sales negotiations.

Tobacco products are required to be labeled with the license number of the factory at which the excise tax was paid. Most cigars are labeled with a band, more or less ornate, to identify the brand. Originally cigar bands were imported from European countries but that situation has been reversed in recent years.

Pre-gummed labels

The effectiveness of the little gummed label is not to be judged by its size. For here is a tool that accomplishes big jobs in a simple, unobtrusive way.

Take the Anti-Blabbermouth labels—reminders not to discuss ship and troop movements—shipments of war materials, etc. These precaution stickers are doing a fine job of assisting their big brothers, posters, in publicizing our war aims and efforts.

"Our fighting forces must have guns, tanks, ships and planes. We will give them these weapons—accurate, fine, reliable—made with our strength, our hands, our hearts and our souls. . . ." Thus begins the Pledge that appears on the reverse side of a red, white and blue windshield sticker Westinghouse issues to its "Soldiers of Production." Other plants have their "Soldiers of Production"—under other names. They, too, are being identified and unified with attractive windshield stickers.

Then there is the production type of label that goes right into the war industry plants. Labels, used for parts identification, routing through the plants, inspection markings, tabbing "Rush" jobs, and in a great many other ways. Simple though they may be, these labels have jobs to do, and to all appearances they accomplish them.

Your humble servants, the shipping label and the correspondence seals, too, are doing their worthwhile bit to aid our country's cause. A little ingenuity employed in the designing of these faithful good-will builders accomplishes very worthwhile results.

Convenience labels

Convenience labels make no attempt to describe the contents of packages or the articles to which they are attached. Address labels are a familiar type, and there

are innumerable "message" labels or stickers which serve a useful purpose when pasted on a package or even on a letterhead. Some of these labels partake of the character and dignity of postage stamps and are extensively used for advertising purposes. They are sometimes called seals although rectangular in shape, and sold in sheets with perforations.

Stock labels

Stock labels in semi-complete form enable small distributors to avoid the expense of special label designs and at the same time obtain quick delivery of quantities to suit their immediate needs. By imprinting a few additional details "stock labels" are ready for use in less time than would be required to prepare special labels. Specialists in this line offer a wide choice of designs, not only for can labels but also for die-cut bottle labels.

Circulars

Circulars which accompany any product at the time of sale are defined by federal law as a part of the labeling, therefore statements or claims made in the circulars are subject to the same limitations as the labels on the packages. Circulars serve a very useful purpose, however, in connection with many special foods which need explanation or the discussion of a dietary regime. Probably the possibilities of circular labeling have not been fully explored.

Outserts

The practice of using surplus label space to advertise other products has been extended still further by using the package or container as a carrier for circulars that are cleverly folded so as to remain closed when labeled to the outside of the container but are easily detached when the container reaches the hands of the consumer. These folded circulars have become known as "outserts." They can be labeled by hand or machine to the outside of cans, bottles, jars, cartons or bags. The manufacturers of outserts summarize the purposes as follows:

1. Variety of uses or recipes.
2. Cross advertising (using one product to help sell another).
3. Premium promotion on the product. It is pointed out that there are no wasted circulars and no cost for distribution.

Label statements

Labels carry the messages by which physical objects describe themselves. What messages *must* they carry? What messages *may* they carry? Public opinion demands certain minima of truth and accuracy. To prevent false or misleading representation, many substances are required *by law* to be labeled adequately to inform the public regarding the true character of these substances. Laws also contain provisions that certain substances, if labeled, shall be honestly and correctly labeled. The sources of law are either federal, state or municipal.*

* See also Chapter II, "Packaging Law."

NATIONAL *Labels*



National printed and lithographed labels and wrappers in the millions have become a familiar sight to American consumers on hundreds of different packaged goods. They are becoming equally familiar to our Allies all over the globe, in the twenty-six United Nations, on Government goods and Lend-Lease merchandise. And, of course, they are to be found wherever the American fighting forces have established outposts.

Many National labels and wrappers are still being used on such essential home goods as soap and tobacco. Our planning department is at the service of every packager serving our fighting men or civilian markets. Production meets the highest standards: top-flight engraving, artistic lithography and letter-press printing. May we serve you?

The National Color Printing Co., Inc.

FINE LABELS • PRINTING • LITHOGRAPHING • ENGRAVING • DESIGN • WRAPPERS
930 E. Monument Street Baltimore, Maryland

Definable qualities of goods

Developments in labeling follow closely the progress made by science in defining properties and qualities of articles offered for sale to the general public. Science must first determine what properties are definable and must establish practicable tests and standards by means of which the labeled products may be tested for compliance with the standards. Unless compliance can be tested within a reasonable degree of accuracy, it would not be practicable to set up a legal definition and a penalty for offering a product that does not conform to the minimum legal requirement.

This practical view of the enforceability of minimum legal standards has resulted in the enactment of laws which *require* certain statements (frequently called "mandatory statements") but nevertheless *permit* certain other statements (frequently called "permissive statements"), provided they do not directly or inferentially misrepresent the qualities of the product.

The mandatory statements in regard to any product are those statements which define the qualities which are likely to be misrepresented to the extent that an innocent purchaser might be harmed by the deception. The product should have the properties which are ordinarily expected by the consumer, and the product should not be adulterated or misbranded to the extent that its value for customary purposes is deceptive.

The development of labeling laws

More than 35 years ago Dr. Harvey Wiley began his crusade against adulteration, misbranding and the use of preservatives to conceal inferiority in foods. As a result, the nation acquired the Food and Drugs Act of 1906, which immediately became the criterion of labeling in interstate commerce. Although intended mainly to require the disclosure of specified ingredients, the subsequent amendments to the law gave it the control of quantity declarations, and to a limited extent, quality standards for canned foods.

More recently the Copeland Food, Drug and Cosmetic Act of 1938 has taken over and enlarged the scope of quality standards and the disclosure of ingredients. Many of the states have followed suit by passing similar or identical Food, Drug and Cosmetic Acts. Other federal agencies have also been clothed with greater authority. Recent amendments to the Federal Trade Commission Act have given it more effective jurisdiction over unfair practices in commerce, including false representations in the sale of goods. Under authority of a special statute the Federal Alcohol Administration has issued detailed regulations for the identification and labeling of liquors, wines and malt beverages. The procedures for determining standards now have all the force and, incidentally, all the intricacy of law. In fact, the principal activity of the Label Manufacturers National Assn. is the study and interpretation of laws, regulations and rulings as the basis of detailed advice to its members regarding correct labeling under federal, state and local laws.

Label defined

The term "label," as used in the Federal Food, Drug and Cosmetic Act, means "a display of written, printed or graphic matter upon the immediate container of any article; and a requirement made by or under authority of this Act that any word, statement or other information appearing on the label shall not be considered to be complied with unless such word, statement or other information also appears on the outside container or wrapper, if any there be, of the retail package of such article, or is easily legible through the outside container or wrapper."

The term "labeling" means "all labels and other written, printed or graphic matter (1) upon any article or any of its containers or wrappers, or (2) accompanying such article."

The regulations state that "labeling includes all written, printed or graphic matter accompanying an article at any time while such article is in interstate commerce or held for sale after shipment or delivery in interstate commerce."

The mandatory label statements

The requirements of the Federal Food, Drug and Cosmetic Act in respect to food labeling are basically few in number. Generally, these requirements are: first, the *name* of the product, if defined and standardized under administrative procedure, otherwise a complete description including ingredients; second, the *quantity* in the container; and, third, the *identity* of the sponsor, and there is a possible fourth, if *artificial flavoring, coloring or preservative* is present, it must be declared. These three or

Decalcomania transfers, applied directly to container surface become a decorative and permanent type of label.





✓ You'd need a catalog big as a metropolitan phone book to list all the packaging and display combinations that can be made from the basic forms named on the dial. For your product, tho, you want just that one combination which will put you through to expanding sales and profits. No simple job, especially in these days of priorities, allocations, and substitutions. But a call to Dennison will minimize your problem. Here, in one single organization, you have at your fingertips all these basic forms, plus designers skilled in creating just the right packages, packaging accessories, or displays for your product.

*Latest addition is Dennison's limp, stretchable, dead-folding, Grade A Greaseproof Ordnance Wrapping Paper.

Dennison Manufacturing Co.

WRITE DEPT. P 43 FRAMINGHAM, MASS. FOR MORE INFORMATION

SALES OFFICES IN ALL PRINCIPAL CITIES

four facts must be conspicuously shown on the portion of the label intended for display purposes. The only restriction on the remaining label space is that it may not be used to diminish the conspicuousness of the required statements or to mislead the purchaser regarding the actual contents of the container.

High lights of the federal act

Compounds—The labeling of a product which contains two or more ingredients may be misleading by reason of the designation of such product in such labeling by a name which includes or suggests the name of one or more but not all such ingredients, even though the names of all ingredients are stated elsewhere in the labeling.

Ingredients—The presence of spices, flavorings, artificial colorings or chemical preservatives must be stated on the label. A product consisting of two or more ingredients must be properly labeled to reveal the proportion of each ingredient. Even though not in package form, a food which contains spices, artificial coloring, flavoring or chemical preservative must be labeled to reveal that fact. Certain ingredients are required to be named if present in drug products.

"New" drugs—Detailed provisions cover the definition and labeling of "new" drugs.

Scientific opinion—Where there is a material weight of scientific opinion contrary to a representation made on a label, this fact may render the label misleading and therefore illegal.

Distribution—If a product is not manufactured by the person whose name appears on the label, the name must be qualified by a phrase which reveals the connection such person has with such product, such as "Manufactured for and Packed by . . .," "Distributed by . . .," or other similar phrase which expresses the facts.

Street address—If the name of the manufacturer or distributor of a product is not shown in the current city directory or telephone directory, it is necessary that the label shall show the street address in connection with the place of business.

Guaranty—Alternative forms for the guaranty are suggested. No representation or suggestion that an article is guaranteed may be made in the labeling.

Conspicuous information—Any word, statement or other information required to appear on the label must be prominently and conspicuously shown on the part of the label which is presented or displayed under customary conditions of purchase. In other words, the consumer must have every opportunity to observe the facts in which she is or may be interested. Failure of the label to include all the essential information will not be excused because of the fact that the label space is used for purposes not required under the statute or because of the fact that the label does not use all of the space available for it on the package.

English language—The English language is required for all mandatory label information, and if the label contains any representation in a foreign language, all words, statements and other information required by the Act must appear thereon in the foreign language. How-

ever, the foreign language must not be permitted to interfere with, or use the space needed for, the labeling which is required in the English language.

Contents—Detailed provisions cover the manner of stating the quantity of the contents in the package, and there is a provision that the statement of weight or measure may be supplemented by the metric weight or measure. With few exceptions the statement must express the quantity in terms of the largest unit of measure contained in the package. For example, the label on a package containing one quart is not permitted to read "2 pints" or "32 fluid oz." Provision is made for tolerances due to unavoidable conditions, and certain exemptions are provided for very small packages.

Open containers—Under certain conditions, small open containers of fresh fruits or vegetables are not required to be labeled, but if two or more such containers are enclosed in a crate or other shipping package, such crate or package must bear labeling showing the number of such containers enclosed therein and the quantity of the contents of each.

Exemptions—Certain exemptions, under regulations, are provided for shipments of products in the trade, to be processed, labeled or re-packed. Exemptions are provided for export shipments if properly labeled according to the laws of the country to which such shipments are to be exported. Certain provisions apply specifically to the labeling of narcotics or habit-forming drugs.

Special statutes*

Most of the states have enacted revised food and drug laws patterned after the federal (Copeland) law. Generally, a substance that is properly labeled under the federal law is also properly labeled under the state law, although in some cases the state laws contain additional or different provisions. Most of the states also have their own pharmacy laws which, so far as they relate to the labeling of drugs and poisons, are in accord with the federal law. The states also have their own laws controlling the sale of narcotics and habit-forming drugs, and their own laws in relation to specific poisons or dangerous substances, such as carbolic acid, bichloride of mercury and wood alcohol.

Alcoholic beverages are controlled by federal legislation and detailed regulations in respect to the labeling of all intoxicating liquors. Some states also have their own laws on the same subject.

Federal and state laws regulate the sale and the labeling of paint, varnish, Naval stores, linseed oil, turpentine, putty and benzine.

Among the substances not intended for human use or consumption are pet animal foods, stock or commercial feeds and tonics, livestock remedies, fertilizers and so-called "economic poisons" for destroying insects or pests.

The labeling of fabrics (*except wool products*)** and other substances not sold in package form is not usually required by law but if found falsely labeled, they can be

* See also Chapter II, "Packaging Law."

** See "Regulations Affecting Special Trades," Chapter II.

IN WAR *as in Peace* FOXON

IN WAR

Imitation Foil Labels

Cardboard Displays
& Signs

Paper Box Wraps

Fibre and Plastic
Name Plates &
Emblems

Metallized Paper Dials
(Laminated)

Cork, Canvas, Felt
Die Cut Parts

Special assembly by
riveting, eyeletting,
stapling, etc. etc.

MOVES AHEAD TO MEET
YOUR WARTIME PROBLEMS

R-E-P-L-A-C-E-S

IN PEACE

Genuine Foil Labels

Metal Foil Displays

Genuine Foil Wraps

Metal Name Plates
& Emblems

Metal Dials
Etched & Litho.

Advertising Specialties
and special peace-time
production.

★ WHAT ARE YOUR NEEDS TODAY?.... UTILITY?.... SPEED?.... ADAPTABILITY?
LET'S HAVE THEM AND WE, TOO, WILL BE EAGER AND GLAD TO ROLL UP OUR SLEEVES FOR YOU.
Never mind whether it comes in the category of packaging. If it's die cut, plain or printed, on thin
material of ANY nature, we can show you how to "bat 'em out" fast and steady. It costs nothing to ask
questions. Why not write or call us today?

THE FOXON COMPANY • PROVIDENCE, R. I.

243 West Park Street

Represented in all principal trading centers of the United States



Left: Tags are shaped in accordance with their functions such as job ticket, sale marker, shop record tag, guarantee, etc. Right: Tags are attached by means of string, wire, metal clip, or ingenious die-cut.

reached by the laws which require honesty in advertising. There is a growing tendency to increase the legal requirements so as to compel complete disclosure regarding component materials and their qualities.

Certain devices are required by law to be placed on labels to protect the public: for example, the skull and cross-bones on poison labels. Among the things which may not be placed on labels are representations of the Flag of the United States or of any State. The Federal Alcohol Administration has prescribed a number of subjects which may not be depicted on any label for alcoholic liquors.

The Federal Trade Commission has approved trade practice conference rules establishing standards and labeling requirements for jams, jellies and preserves, and many other products outside of the food line.

Guaranteed quality standards of certain products are indicated by "Seals of Approval" furnished by *Good Housekeeping* magazine, the American Medical Assn. and by some trade organizations.

Labels that undertake to state or imply that products comply with federal specifications should conform to the regulations of National Bureau of Standards in regard to the language of quality-guaranteeing labels.

If the National Bureau of Standards tests a device and issues a certificate applying to that device, the manufacturer may advertise (label) that fact, provided he does not create the impression that the National Bureau of Standards has tested and approved the manufacturer's line of products.

Complete labeling of drugs—including prescription-only preparations—has recently been requested by the National Association of Retail Druggists as a war emergency measure. Rapid induction of physicians into the

armed forces, the association declared, will find many communities without a doctor, leaving the pharmacist as the only public health man. Labels on every package, therefore, should reveal to the pharmacist all necessary information concerning the product.

Paints and varnishes are covered by strict labeling laws, both federal and state.

Beer and malt beverage labeling has had a hectic career in recent years. When cans were plentiful and cheap, canned beer enjoyed a very large distribution for a few years. Now it is difficult to obtain enough bottles. Like all alcoholic beverages, beer and ale are subject to state as well as federal regulations. Everything shown on the label must be approved by the duly constituted authorities. Type sizes and pictorials are subject to strict rules.

Many *meat products* are prepared and packed in the general manner of sterile canned and bottled foods. There are also other methods of placing *meat products* in *wrappers* or coverings which are required to be marked in establishments where the entire output is under federal inspection.

Poultry products are packed under the jurisdiction of the Agricultural Marketing Administration under standards for both fresh and canned products.

Shellfish packing establishments have the privilege of government inspection under which they may label their goods in a manner to indicate that fact. Strict sanitary regulations cover the entire establishment.

Protecting the consumer

It is fair to state that no movement towards informative labeling can proceed far without the active interest and cooperation, if not the initiative, of actual consumers.

It's a CHANGING WORLD !

When you change YOUR package be sure to retain
BRAND IDENTITY and PACKAGE RESEMBLANCE!



When you undertake to change your package to meet wartime restrictions it will pay you to consider not only present conditions but also the past and the future. Be sure your new package resembles the old one as closely as possible. Be sure it is easily recognizable by the consumer.

For expert help on packaging problems enlist the services of packaging specialists who are familiar with every angle of good packaging . . . materials, design, finishes, coatings. Our experience covers a long list of package changes. Our facilities are large and varied. For packages designed to appeal to the consumer let your "U-S" man serve you.



THE UNITED STATES PRINTING & LITHOGRAPH COMPANY and DIVISIONS

Home Office 350 Beech Street, Cincinnati, Ohio
Sales Offices in Principal Cities



5 Great "U-S" Plants STRATEGICALLY LOCATED

PRODUCING PACKAGING AND LITHOGRAPHED ADVERTISING OF HIGHEST QUALITY

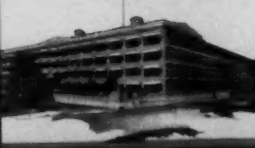
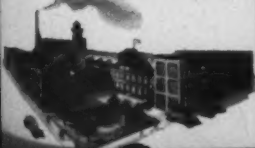
BALTIMORE

BROOKLYN

CINCINNATI

ERIE, PA.

ST. CHARLES, ILL.





Pregummed labels spot messages where they are sure to be seen. Current examples show the influence of the war.

The standardizing and defining of grades and qualities by official, quasi-official and purely voluntary organizations stems from the demonstrated need for better information and better understanding on the part of the consuming public. The various organizations of consumers have performed yeoman service in pointing out the needs which subsequently initiate the official determinations of standards made available by label declarations and honest advertising. The part taken by the Federal Trade Commission in preventing false and deceptive advertising claims has been of enormous benefit to the public and incidentally to the great body of honest distributors who find it difficult to contend with the inducements offered by unscrupulous competitors. Labeling is a form of advertising and, to the extent that the Federal Trade Commission has jurisdiction, both primary and concurrent, with other agencies, may be the object of solicited care on the part of FTC.

The genesis of label terminology

Today's field of permissive labeling will be tomorrow's field of mandatory labeling. In other words, the exploration of the definable qualities of goods, and the consumer's expectations with reference to such goods, leads to the adoption of semi-official standards which, if used as label terms, have a legal meaning with reference to the qualities of such goods. At the same time, such exploratory investigations of definable qualities lead to simplification and standardization of terms, which, through their educational value to consumers, justify a reliance upon the goods so labeled. Consumer education in respect to definable qualities eventually leads to the legal adoption of such terminology.

Various expressions have been used in respect to the twilight zone or label terms. "Grade" labeling has received semi-official sanction in respect to certain foods for which intermediate standards have been officially adopted. "Descriptive" labeling is a term which con-

notes an educational process in relation to the labeling of canned foods. "Informative" labeling is a similar term used for the same general purpose, but more frequently applied to fabrics for the purpose of assuring that their quality shall be suitable to the average consumer's expectations.

A-B-C grades

Although the Food, Drug and Cosmetic Act does not require that the Department of Agriculture shall establish more than one standard for a food product, nevertheless the Department, acting through its agency, the Agricultural Marketing Administration, has developed methods of grading certain canned fruits and vegetables and has designated such grades as A, B or C, according to the score sheets and the summation of factors having numbered values.* A canner may grade his own fruit and vegetable products and may employ grade terms that he has set up for his own use, except that he may not use the terms "Grade A," "Grade B" or "Grade C," unless such labeled products meet the requirements for the specified grade as defined by the Agricultural Marketing Administration.

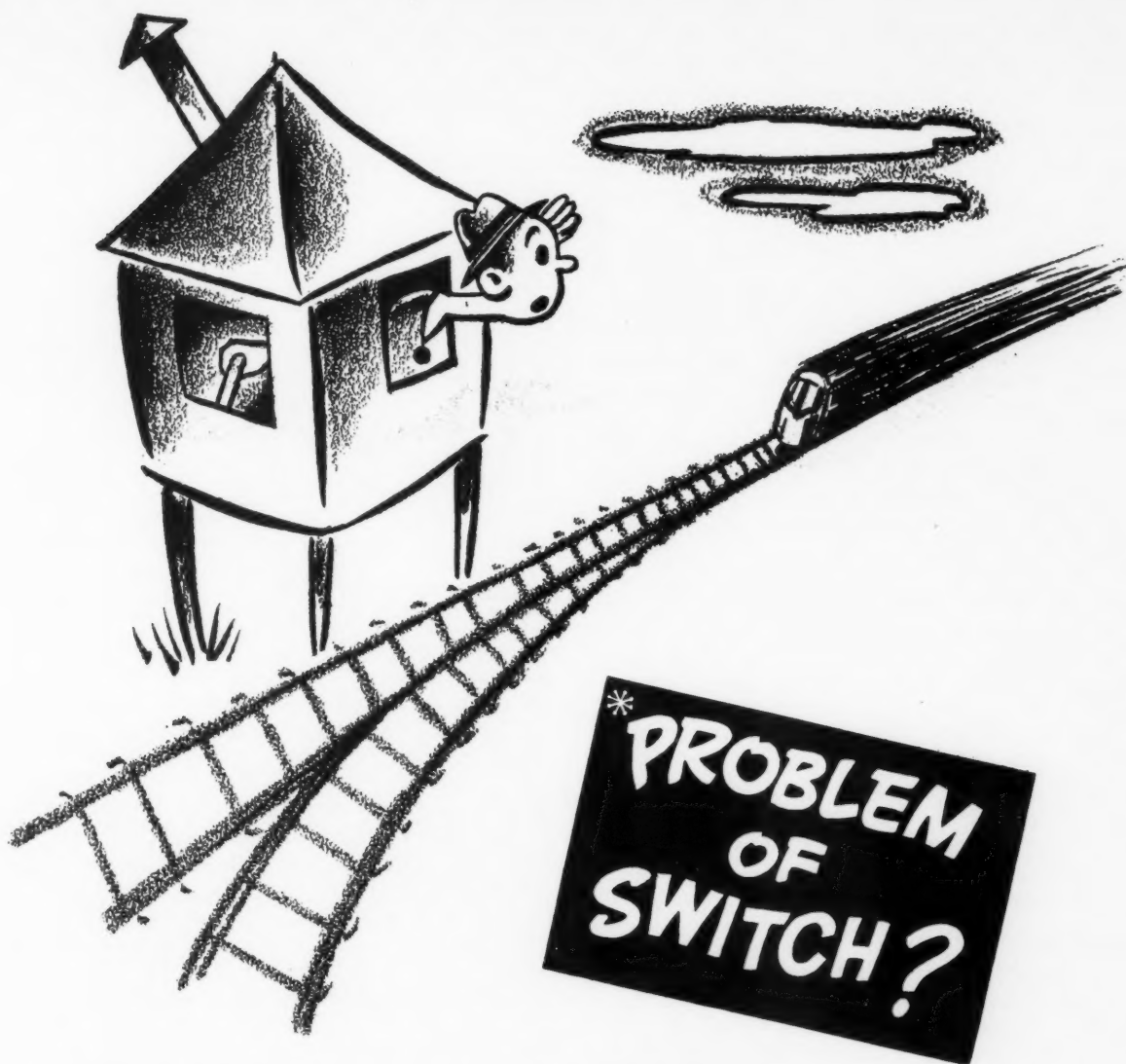
U. S. Grades (ABC)

Inspectors of the Agricultural Marketing Administration of the United States Department of Agriculture have been located in certain canning factories under the "continuous inspection" experiment, requested by the canners who pay the cost of the service. Government inspectors are on duty all the time the plants are in operation, observing each step in the preparation of the product. Inspectors are furnished only to plants that are using AMA grade terms in the labeling of their products. All these plants meet certain strict requirements relating to housekeeping and sanitation. Only canned fruit and vegetable products packed in plants under the "continuous inspection" of the Agricultural Marketing Administration may carry the prefix "U. S." in connection with the grade designation.

Consumers can buy grade-labeled canned goods—with or without the "U. S." prefix—in many retail stores throughout the country. If the prefix is used, however, it means that the product has been prepared in a plant operating under continuous inspection of the Agricultural Marketing Administration, and that the inspector has certified the grade. If the prefix is not shown, the grade statement means that the packer or distributor assumes the responsibility for the accuracy of the grade designation.

The canners who have adopted the U. S. inspection have formed an organization known as the U. S. Inspected Foods Educational Service, a non-profit association for the purpose of promoting the merits of continuous inspection and grade labeling. Recently it was announced that 55 establishments are using the service.

* December 13, 1942, OPA announced that grade labeling would become mandatory on canned foods as "the best mechanical means of instituting equitable, effective and enforceable price control."



'Most every product in 'most every industry has been compelled to SWITCH from vital to non-vital material for containers . . . and, important to supplement that container is your selection of THE LABEL which is going to represent your newly dressed package. A planned, intelligently designed label can tell its own story and sell your product.

*CASE HISTORY

Manufacturer "X" switched from lithographed tin to glass. Our designers created attention-compelling labels with selling message on front and directions on the back (to be read through clear liquid). A cost check proved the new, more attractive label cost less than the previously lithographed-on-tin job.



Twenty-five years of specialization, low cost, mass production methods, creative art staff, complete range of colorful papers.

Send us your glass, paper, wooden containers (or any others) and we'll design a label to carry your name and message. No obligation, of course.

EVER READY LABEL CORP.

143-47 EAST 25th STREET NEW YORK, N. Y.

Appropriate grade terms

Apparently the use of alphabetical grade terms is not equally applicable to all commodities. Speaking before a recent session of the American Association of Textile Chemists and Colorists, E. M. Edgerton, of Pacific Mills, is reported to have said: "Graded Terminology A, B, C, D and the resultant inequalities have also been extensively explored. This type of grading so dear to the heart of the professional consumer may well apply when only a general all around quality is to be expressed, as for meats, canned fruits or eggs, but when a number of different qualities are to be described, dependent upon the use of the product, good descriptive terminology with required accompanying care and handling instructions, if set up in Fair Trade Practice Rules, will better serve the interests of the consumer than dependence on the technical ability of the sales person to interpret properly the relative value of Grades A, B, C or D, for colorfastness to washing, light, wet and dry pressing, perspiration, wet and dry crocking, cleaning wet and dry and gas fading. The causes and effects of these proposed Fair Trade Practice Rules, regardless of their original intent and conception, are now far more important than many people realize. They have a direct bearing on our civilian economy and production, and thus on our part in our fight for the kind of existence to which we believe we are entitled. A misrepresentation, either in labeling or even in the abstinence from labeling, which results in the discarding of an article of wearing apparel, because of unsightliness, before it has served its normal usage purpose, is as much an act of sabotage in the wastage of our prime weapon, production, as any fifth column or subversive activity."

Descriptive labeling

The never-ending search for definable characteristics of products is well illustrated in the experience of the National Canners Assn. The requirements of federal law as to purity and wholesomeness and the basic standard of quality still leave opportunity to produce canned foods having individual and varying characteristics. The housewife is enabled to select among good products, something which will suit her own and her family's tastes and likes; she is relieved of the necessity to distinguish between shoddy and good products. Certain fundamental principles have been developed by the canning industry which may well apply to the labeling of any consumer goods.

The fact that a purchase at retail is not a matter of discriminating between good and poor but is largely a matter of individual preference (special use), simplifies the labeling problem in one respect. Individual preferences have a way of surviving and it is unwise to establish or indicate what may be presumed to be general preferences. The indicated course is to state characteristics in commonly understood words and to let each purchaser make her own selection. Or, to put it another way, the most informative label is the one which carries the most complete set of specifications phrased in ordinary, non-technical words.

Nearly a decade ago the National Canners Assn. created a labeling committee composed of leading growers and canners, guided by the NCA staff of research experts and field representatives in contact with consumer opinions. The Labeling Committee has set forth the basis for the "adequate label" in the following definition:

"The adequate label for canned foods states separately in specific terms, uniformly used, readily understood by the ordinary person, and in legible type so arranged as to be easily seen and read, every fact about the product which is genuinely useful to the consumer and which can be stated. For the sake of uniform use and of equitable and ready enforcement, each term is either self-defined or is based upon an objective definition and standard."

NCA puts it this way: "Terms for label use must be single words or short phrases. Terms must be specific—generalities permit too much latitude in use and allow too much variation in consumer interpretation. Terms must be common words or phrases, readily understood by the ordinary person. 'Very young' as applied to canned peas means more than 'alcohol insoluble solids 12%.' Terms must be either self-defined, such as 'half' peaches or 'peeled' apricots, or they must be based upon objective standards as in the case of 'uniformly red' used for canned tomatoes. This requirement is essential to insure uniformity of use and to simplify enforcement under the misbranding section of the F. D. & C. Act."

The method employed by the Labeling Committee of the NCA in establishing terms for label use is believed to be practical and realistic. The industry produces many products, each of which must be considered individually. At the same time, the labeling of each product must follow general principles, uniformly applied.

The functions of an individual NCA commodity committee are:

1. To review and analyze the differences which may exist or the characteristics which may vary in the product as it is found on the grocer's shelves.
 2. To select the characteristics which are important to the consumer. In some cases this is relatively easy. In others it is necessary to go to groups of consumers for their decisions.
 3. To select label terms to identify the characteristics which are important. Frequently this is the most difficult part of the job. Trade terms are satisfactory only when they are also good consumer terms. (Here again, it is necessary to go to the consumer to settle the question.)
 4. Terms having been selected, standards for the terms must be established. Sometimes additional steps must be taken. Further procedure consists of making trial packs, laboratory tests, examination of many samples representative of general production and further conference with the product committee.
- When these steps have been taken, the recommendations of the individual product committee are reviewed and acted upon by the general labeling committee. This procedure has been successfully employed for most of the important fruits and vegetables.

Like WATER off a duck's back!



◀ That's the way **PALM, FECHTELER** colorful decals shed water



... so well, in fact, that Shulton uses them on *soap*. They actually outlast the soap in use, proof positive of their water-shedding and toughness.

The jar labels, in both black and white, and in rich colors for Gourielli Apothecary, Inc., are a new application of packaging's finest transparent decalcomanias: Engradel*, famous for alcohol resistance.

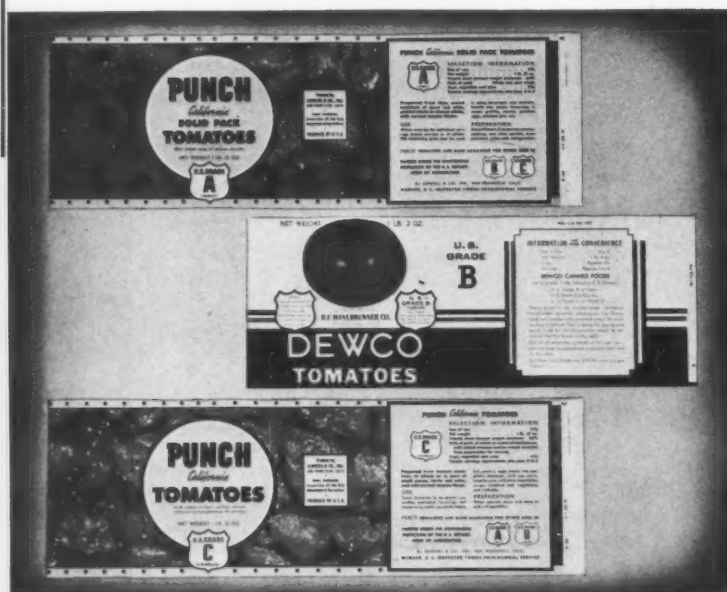
For decoration and identification on every surface—glass, wood, paper, plastics, cellophane, etc.—in colors; easily applied in your own plant, by unskilled labor, under your own supervision when and as you need the packages. Ideal for use with stock containers. When you use Palm, Fechteler decals, you have no packaging inventory worries. Your packaging situation is kept fluid—especially valuable in these days of quick changes and manpower shortages.

PALM, FECHTELER & CO.

220 W. 42nd St., New York City 21 E. Van Buren St., Chicago, Ill.

EAST LIVERPOOL, O., BOSTON, BUFFALO

* U. S. Pat. No. 1803836



Two methods of grade labeling. Above: The voluntary indication of ABC grades according to government standards, but without government inspection. Below: Grade label on products packed under continuous AMS inspection.

If the consumer is to benefit to the fullest extent from complete description or specification, the label must be so arranged and printed on the display area that the information will be easily seen and quickly read. To accomplish this purpose, the labeling committee, in its recommendations, has followed the examples and principles of the newspaper headline which is constructed to tell a story at a glance. The committee further recommends the use, on the back panel, of a "table of facts," which is a summary, in tabular form, of every item of importance to the consumer.

The design of labels for consumer guidance need in no way, and should not, interfere with individuality, brand emphasis, shelf appeal or merchandising values, according to the NCA labeling committee.

NCA has recently issued a new edition of its Labeling Manual which includes a table of label terms for all canned fruits and vegetables and most of the seafoods. This table gives both the mandatory terms and the terms recommended for voluntary use. Another section gives the standards on which the voluntary terms are based. The manual also contains a set of full, four-color, full-size, example labels designed primarily to give the consumer information.

Informative labeling

The National Consumer-Retailer Council emphasizes that informative labeling offers very real advantages to the manufacturer, the retailer and the consumer. The first requisite, of course, is that labels shall conform to local, state and federal regulations applicable to the particular product. The council has summarized its analysis by listing the following points:

Outline for informative labels

What it will do (performance)

Degree of color permanence; shrinkage or stretching; breaking strength; seam slippage; resistance to water, perspiration, wind, wear; light, heat and power tests; power consumption; cost of upkeep.

What it is made of (composition)

Kind and quality of fibre, metal, wood, leather, ceramics, cement, rock, fur, plastics, petroleum products, rubber, paper, bone, chemicals, drugs; ingredients of food products; etc.

How it is made (construction)

Size, weight, number of yarns per inch, weave, number of stitches per inch, finish, ply, cut, hand or machine made, pressed, molded, stamped, inlaid.

How to care for it

Detailed instructions for washing and/or cleaning; precautions to be observed in cleaning or storage; refrigeration; oiling and greasing; polishing; etc.

Recommended uses

Purposes for which it is most suitable; recipes; etc.

Name of manufacturer or distributor

Name and address of the manufacturer or distributor.

An authority on the use of informative tags insists that a trade name is desirable for every product, or line of products. This authority, in discussing the benefits to be derived from the carefully planned use of informative tags, summarizes the advantages as follows. The use of informative tags does these things:

- (1) **Establishes a trade name:** The name being on the merchandise at the point of sale, it sticks in the mind of both clerk and customer. The importance



A Sample Of Embossing And Color Printing

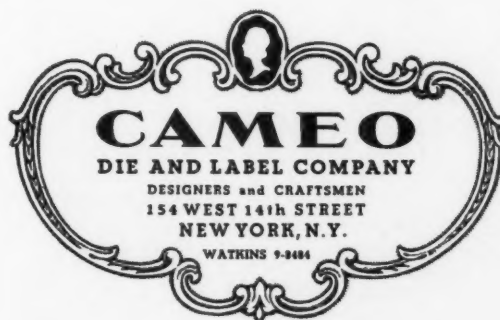
←

THIS MAY SUGGEST A USE FOR YOUR PACKAGE OR PRODUCT

The disappearance of foils and metallic papers from the packaging picture need occasion no alarm nor change of plans by packagers who wish fine embossed, color-printed labels, wraps, seals or tags.

We are doing similar exquisite three-dimensional work on available papers, both white and colored, achieving the beautiful effects of color and relief which used to be seen on foils, and which no other *reproduction method* can match on any surface.

There are substitutes for materials—there is no substitute for the craftsman's skill in designing, making dies, printing and cutting, all of which operations are performed in our plant under direct supervision. This service guarantees the finest results.



IN CANADA: CAMEO METAL SEAL & LABEL CO., LTD., 371 DOWD ST., MONTREAL

PACKAGING CATALOG

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of establishing a trade name is further indicated by surveys which have shown that more than 50 per cent of retail sales may be due to the selling-power of a well-established name.

- (2) *Acts as a silent salesman:* Keeps the customer occupied until the clerk can serve her; saves the clerk's time by answering questions the customer must otherwise address to him.
- (3) *Trains salespeople:* Gives them the basic facts and strongest selling arguments—and phrases—concerning each product; is of especial help to the new salesman—and, similarly, facilitates transfers of clerks from slack to busy departments during holiday seasons.
- (4) *Gains the good will of consumer organizations:* By presenting facts.
- (5) *Promotes correlated selling:* By mentioning other items in the line.
- (6) *Cuts losses on returned goods:* Helps the customer make the proper initial selection; helps to eliminate returns due to improper use or care of an article. Verbal instructions cannot take the place of a written reminder.
- (7) *Re-sells the purchaser after the sale:* An informative tag on a product helps to maintain the state of mind that prompted the original purchase—a corollary to No. 6.
- (8) *Meets legal requirements on marking:* When the law requires certain information on a tag it might as well carry special selling information also.
- (9) *Combats vicious competitive prices:* A tag or label on better merchandise can justify the difference in cost over cut-price goods.
- (10) *Fosters step-up selling:* A customer will often willingly pay \$3.98 instead of \$2.98 if it is made clear that extra wear, extra satisfaction, extra comfort, etc., go for the extra dollar.

Liquor labels must present information as required by Federal regulations as well as those of certain states.



- (11) *Makes advertising more effective:* Reminds the customer, at the vitally important point of sale, of all the advantages stressed in other advertising. A tag fills the time-gap between the moment of reading a company's advertising and the moment of arriving at the decision to purchase—a gap which frustrates many sales.
- (12) *Helps the merchandise buyer:* He can classify the product in his line, and buy more intelligently. It may also show up unnecessarily numerous price lines, thus suggesting the elimination of some of them.
- (13) *Improves customer relations:* By infusing store customers with confidence in the performance to be expected from the article . . . provides a new means of interesting customers in what they are buying and provides striking evidence of the store's willingness to give the consumer facts about what the store is selling.
- (14) *The consumer benefits from informative tags and labels because:* (1) anything that helps to reduce the cost of merchandising and selling is eventually reflected in lower prices to him; and (2) an informative tag or label which enables him to buy, use and care for merchandise more intelligently, conserves his income and raises his standard of living just as surely as an increase in pay.

The National Association of Food Chains has taken an active interest in the development of informative labels for canned foods and the testing of consumer opinions. In submitting the plan to its member organizations, NAFC states that labels should carry the following information in addition to established requirements of the Federal Food, Drug and Cosmetic Act: (a) Grade designation; (b) comparative scoring; (c) description of contents; (d) under certain conditions, an optional test by-line, e.g., "This is the type of label suggested by the National Consumer-Retail Council."

Color fastness

The labeling of dyed *textiles* raises certain problems which are peculiar to this kind of merchandise. Recently the call for informative labeling has attracted national attention owing to the moves of the Federal Trade Commission to set up standards for textiles which will indicate to the consumer the exact degrees of color fastness of fabrics and garments. Extensive hearings have been held, in which manufacturers, distributors and consumers all have had a voice. While there has been disagreement on the phraseology and on the technical details, it is significant that throughout the hearings everyone agreed that informative labeling is serving a worthy purpose in educating the public to standards of quality.

It is readily appreciated that in colorfastness standards, for instance, a color which is fast to washing is not necessarily as fast to light, or to crocking, or to other color-destroying agencies. Fabrics are designed for the

LABELS

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ORDINARY LABEL PROBLEMS,
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FOR EVERY PURPOSE. LET
US PREPARE SKETCHES AND
QUOTE ON YOUR REQUIRE-
MENTS.

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Type of informative label for textile suggested by N. C. R.C. showing thread count, breaking strength, weight, etc.

use to which they are supposed to be put, and standards are set so that the fabric will last longer when put to its intended use. If it is used for some purpose other than the one for which it was intended, then full warning should be given that it may not be as serviceable.

Simplification and standardization

A verified identity may be the cornerstone of several structures. Price is the money value of a defined article. Standardization and definition are therefore an integral part of the price structure. Comparisons of price, either for competitive purposes or for the enforcement of government controls, can be made only between transactions that are on the same identical basis. The conditions prevailing during wartime have made it necessary to simplify and standardize products in order to eliminate the inefficient uses of materials; these same conditions have made it necessary for such products to be labeled as a means of establishing identity and quality. Products which fail to bear adequate evidence of standardization will be handicapped in the market places.

Protection of the consumer against deterioration of quality under wartime restrictions and limitations is an obligation of the Office of Price Administration.

Technicians of the Standards Division staff of OPA will develop provisions for quality, quality definitions, labeling or other standards devices as may be required to accomplish the purposes of regulation.

Label space and advertising

The label space used for mandatory statements is usually a small part of the available space which can be used profitably to praise the labeled product or to advertise other products sold by the same distributor. The space is extremely valuable because it works at the point of sale, assisting the merchant in arousing the customer's interest and favorable consideration. After the goods are sold the effective label space continues to exert a strong influence with Mrs. Consumer by stimulating the desire to use the goods and to benefit by such use. No

product is fully sold until it is consumed. The bigger the label, the better it works, especially in the home where it confronts the whole family. This is notably true of the wrap-around style of labels on food cans and jars. Recipes and suggested food combinations take the foods out of the pantry and onto the family table. To quote one very level-headed authority: "The most satisfactory method for communicating information from manufacturer through retailer to consumer is a label attached to the product." This quotation is attributed to Mrs. Saidie Orr Dunbar, president of the General Federation of Women's Clubs. Circulars or "outserts" that accompany the goods are in the same class, so far as attention-getting value is concerned. Like labels they ride free into the home and right up to the last hurdle.

All parts of the label and the circulars accompanying the goods are a part of the labeling and are subject to the same regulations in respect to their claims or representations.

Required statements use 10 per cent of space

The required label statements need only a limited amount of space—less than 10 per cent of the area of an average can label. The larger part of the space on can labels is exceedingly valuable as a medium to reach and influence the consumer. The packers of food products are especially fortunate in the amount of space at their command. The trend of distribution methods and the development of product descriptions have together operated to place the consumer in position where she expects the product to tell its own story, completely, truthfully and interestingly. That situation is not unwelcome to the dealers and the middlemen; they would rather handle a product that relieves them of responsibility; they would rather display and otherwise encourage the sale of goods whose labels obviously strive to interest and please the consumer.

Fifteen optional uses of free label space

In contrast to the few mandatory statements, it is interesting to note the wide range of permitted uses of label space. An examination of many labels now in use reveals at least fifteen ways to use label space to increase the prestige of the product. For example:

- (1) **Brand name:** Experience and tests combine to prove that the memory factor is most closely associated with the idea of a well-chosen brand name. For protection, brand names are usually registered in the United States Patent Office.
- (2) **Trade marks** are usually special designs which are used to identify all the products of a certain manufacturer.
- (3) **Vignette:** Next in importance as an aid to the memory or identification is a picture or vignette. Among certain classes of consumers, the picture is more important than the brand name.
- (4) **Side panel:** The side panel has recently become a sort of overflow-space to supplement the front

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panel of cylindrical containers and to feature a complete statement of so-called government information.

- {5} **Background:** The background serves to contrast and enhance the artistic value of the label and may be used in an all-over design to visualize the product.
- {6} **Recipes:** Recipes have been found to serve the consumer's desire for suggestions of variety in the preparation of foods. It is possible to print recipes on the reverse side of can labels. Visualized recipes are the natural color reproductions of appetizing dishes prepared from the contents of the can.
- {7} **Back panel:** Other items in the line are mentioned on the back panel sometimes accompanied by color reproductions of such items, or of dishes prepared from such items.
- {8} **Novelty designing:** It has been found that foods for the very young are more acceptable if decorated with juvenile themes. An interesting development in this line was a prize winner in a packaging contest.
- {9} **Dietary claims:** If any product is represented as of value in correcting a dietary or vitamin deficiency, it is a food for which special regulations under the FDC Act will apply.
- {10} **Premium offers:** Coupons and prizes can be advertised on the labels.
- {11} **Special appeals:** Foreign languages are often used in addition to English on products that appeal to the foreign population. If any required statements are in the foreign language, all the required statements must be there in both languages.

{12} **Awards:** Reproductions of Exposition Medals and Awards for Merit are believed to increase the prestige of the product. They must be genuine and in accord with the facts.

{13} **Endorsements:** Seals of approval authorized by such organizations as the American Medical Assn. or *Good Housekeeping* magazine.

{14} **Display labels:** Labeling for display purposes includes a two-way arrangement of text and picture, so that either upright or horizontal position of the can may be viewed equally well. This was a first-prize winner in a recent packaging contest. The development of self-service markets has brought to light some interesting observations about the mental reactions of women shoppers in relation to a display of goods; they will not pick up goods if the act is likely to disturb or disarrange the display; they will not touch a stack of goods that has the slightest appearance of instability, but they will pick up from a jumble of cans lying on their sides.

{15} **Coloring Tabs:** Another adaptation of labels is a patented detachable stub impregnated with a food dye which can be used to restore the natural color of the food after cooking the contents of the can.

Credit: The labels illustrated in this chapter were collected by the Label Manufacturers' National Assn. from makers of labels of every kind and description, regardless of membership in that Association. The list is too long for inclusion here, but their generous cooperation is gratefully acknowledged.

The National Canners Assn. advocates descriptive labels giving every fact about the product genuinely useful to the consumer and which can be stated. Every such label is "a messenger that rides on a pass."



PACKAGING *in Plastics*

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Wartime Packaging in Plastics

IN approaching the subject of plastics in packaging, the packager is liable to make two mistakes: Either through ignorance of expecting the impossible of these miracle materials about which he has heard and read so much in the public press, a good deal of which may be laid to the newspapermen's desire for sensational news; or, conversely, through but a smattering of knowledge, gleaned from some semi-technical source, about the thousands upon thousands of chemical formulations which are being made today, and he may recoil from so complicated a field without properly exploring it.

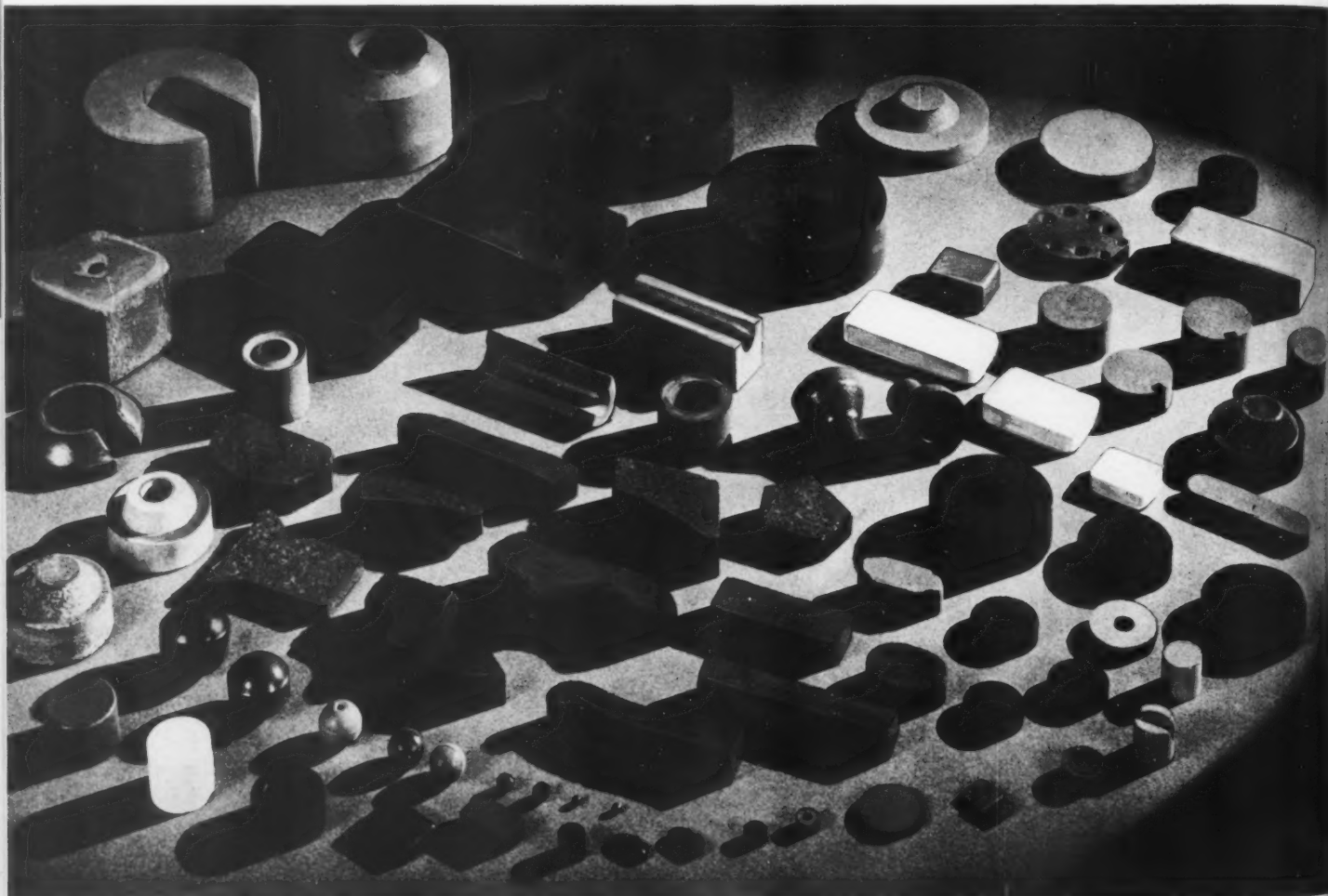
It is no exaggeration to say that the past history of modern synthetic plastics in all fields, and especially so in the field of packaging, has been but a short prelude to their increasingly expanding future. In the past, plastics have found many special uses, but basically, as packaging materials, their use has been confined to two

generic applications: the manufacture of bottle and jar closures, and as packages and package parts for cosmetics, toiletries, jewelry and luxury products.

What are plastics?

Basic reasons for the use of plastics in packaging are that most plastics are synthetic (man-made) materials, which can be molded or formed to practically any shape. They are resistant to many chemicals, moisture and weather conditions, and they have excellent qualities of durability, strength and beauty. As synthetic materials, plastics can be manufactured with "built-in characteristics." Thus, under any given category or material, it is easy to obtain possibly thousands of variations according to the need of the user and the final application of the material. This versatility, of manufacturing into plastics whatever properties may be desired, is of

Preforms, or pills, of plastic powder, compressed into predetermined weights, and which approximate the shape of finished plastic parts, are easier to handle, save time and materials. Photo F. J. Stokes Machine Co.



inestimable value to all users. The very name *plastics* suggests ease of manipulation. They can be molded, drawn, extruded, laminated, cut, sawed, drilled, glued, stamped, branded or fabricated into numberless shapes of endless application.

The characteristics of plastic materials are different from one material to another, and from one formulation of the same material to another compound within the same general group. (A brief outline of the various plastics and their properties will be found later in this chapter.) The combinations and possibilities of plastics are so wide that it is best to consult with a molder or fabricator and material supplier before making any definite decision on selection of a material.

The beauty of plastics is so well known that comment is almost unnecessary. Some of them have unusual light-reflecting and light-transmission qualities, which, added to their wide range of color possibilities, have earned for them the title of "jewels of industry." They can be transparent, translucent or opaque, as the user desires, and the color range is as wide as the spectrum and as fine as the human eye can detect.

This, and it should be emphasized, is the past history of molded plastics. Plastics come in many forms and it is wise for the packager to think of them in terms of

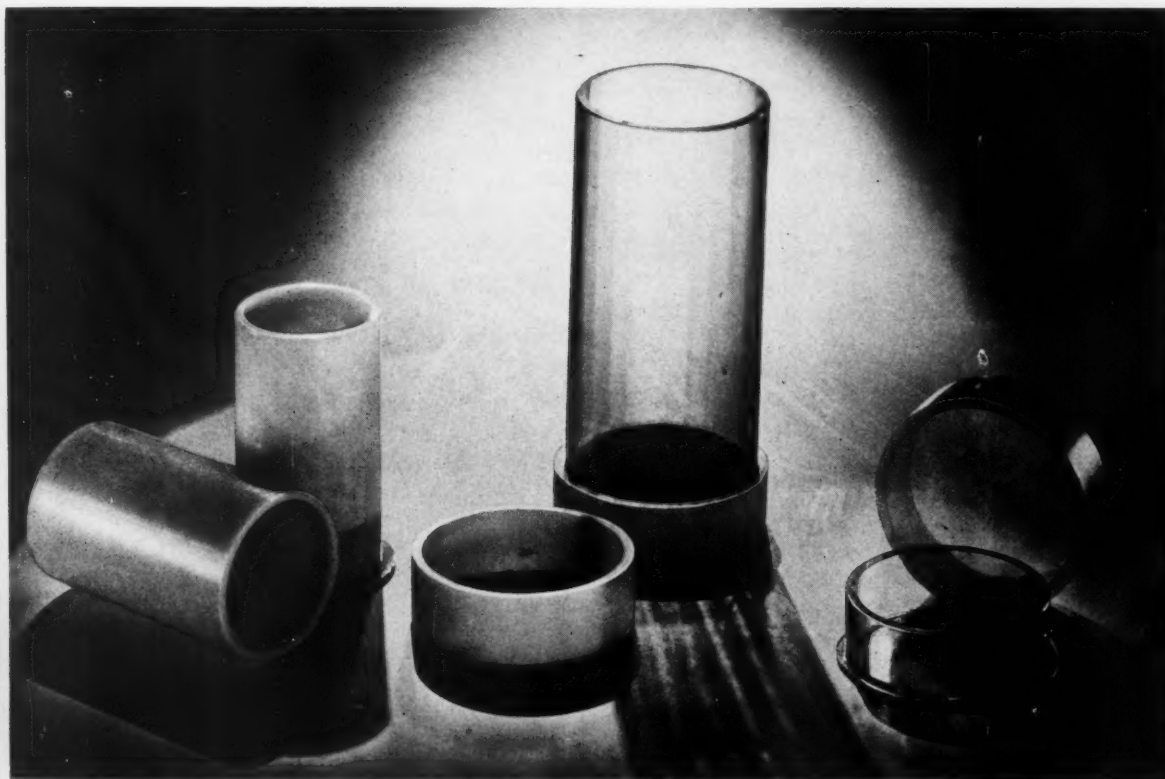
(1) their physical shape, and (2) their physical and chemical characteristics. From the viewpoint of outward form, plastics may be purchased as sheets ranging from very fine gauges to extremely heavy ones, rods, tubes and extruded profiles, as powders for molding and extruding and as liquids for coatings.

There are some packagers whose business makes it economical for them to purchase the molding powders and who may have facilities for complete molding operations within their plants, but these are few and far between. Likewise, not many packagers actually fabricate their own plastic containers from sheets, rods or tubes, except those who have bag-making equipment handling the finer gauges of sheet materials.

Plastics as you want them

The important thing to remember about plastics is that they can be almost anything conditions require, and that they can be manufactured into practically any form desired. The limiting factors are, of course, the number and types of plastics now on the market, the cost of materials and fabrications, and the physical and chemical characteristics of the product and marketing conditions. There are two basic types of plastics materials classified: thermosetting and thermoplastic.

Extruded plastic containers for dry products give interesting promise of what lies ahead for luxury packages. A wide variety of diameters and materials are obtainable. Photo, Extruded Plastics, Inc.





Molded urea holders glorify the Bab-O can into a decorative household item. They are available in red, blue, green and ivory to slip over the tin cleanser container. Rubber closure base prevents scratching or staining. Molded by Mack Molding Co. Material by Plastics Division of the American Cyanamid Co.

Thermosetting materials

Thermosetting materials have the characteristic of taking a final chemical form under heat and pressure. They cannot be remolded or ground up for re-use as scrap. Typical examples are: phenol-formaldehyde, urea-formaldehyde, melamine-formaldehyde and phenol-furfural.

Thermoplastic materials

The other general type of plastics is the thermoplastic group. As materials, these are generally more expensive than thermosetting materials, although their low specific gravity may compensate for the increased price per pound in some instances. Unlike some of the thermosetting compounds, the thermoplastics, as a group, are colorful and transparent and very adaptable to design. They have the faculty of constantly repeating the physical change from solid to liquid and back again. They soften under heat and can be formed at moderate temperatures. They can be re-ground as scrap if not satisfactory, and, after treatment, can be re-worked. Some of the thermoplastics are: cellulose acetate, cellulose acetate butyrate, cellulose nitrate, ethyl cellulose, polystyrene, methyl-methacrylate and the vinyl resins.

Changes in technique

In the past, the molding characteristics of the plastics have determined the methods by which they were handled. Thus, originally the thermosetting materials were molded only by hydraulic compression presses, and the thermoplastics were handled first by compression and later by injection molding methods and extrusion. All plastics in the form of sheets, rods and tubes could be and still are fabricated on various types of woodworking machinery such as saws, cutters, drills, punchers, grinders, buffers, markers and stampers.

The rapidity of progress in plastic molding and fabricating methods, however, accelerated by the impact of

war, makes this picture a fluid rather than a static one. Thermosetting materials can now be injection molded in regular automatic injection equipment with a special attachment, and they are also being extruded. Thermoplastic materials, when handled by the injection method, had been confined to comparatively small pieces and light weights per molding cycle. But the commercial sizes of injection molding presses has increased from an original ounce to 2-, 4-, 8-, 16-oz. and even larger press sizes. There is no theoretical limit to this expansion, and it is unwise to generalize here on the methods of molding which may be in effect after the war. (*A discussion of this point will be found on page 292.*)

If it is unwise to be overly cautious in regard to plastics, it is equally unwise to be overly enthusiastic. Before making any final judgment as to the applicability of plastic materials and manufacturing methods to a particular package and product, it is best to make a complete investigation of the field as it will exist after the war when packagers will be able to get materials and manufacturing capacities they will require.

Approaches to plastics

There are several ways to approach the field and they should all be utilized. For the manufacturer who wishes to study plastics thoroughly, *Plastics Catalog* offers itself as the complete sourcebook of information.* For those who want to supplement study with seeing and talking, it is advisable to consult with the manufacturers of plastics raw materials whose names will be found in the directory at the back of this book, and also with molders, fabricators, laminators and extruders of these materials, whose names are also in the directory section. Most plastics for packaging are bought from a custom fabricator, and full advice will be given gladly by molders and materials companies to any packager who may be a potential customer.

* *Plastics Catalogue Corp.*, N. Y., \$5.00.

Advantages of plastics

Plastics offer many important advantages to the user. A primary characteristic is durability. Plastics can be made to resist most chemicals, moisture and abrasion; they can be produced with excellent tensile, flexural and impact strengths. Modern molding methods have made plastics economical to use. They can be molded on automatic or semi-automatic presses in molds having many cavities to reduce unit cost. Plastics can also be manufactured by other methods, some quite inexpensive.

Facts about molds

The problem of mold construction is an important consideration in the economics of plastic applications. Molds are expensive, initially, and unless the moldings they produce are to sell for a high price in conjunction with the packaged product, the mold costs must be amortized by long runs or mass production methods. Well-made, heat-treated steel molds will stand up for hundreds of thousands of molding cycles. The total number of pieces can be computed by multiplying the number of cavities within the mold by the number of cycles. It is not an unusual thing to see a large compression mold for closures, having 200 or more cavities. This means that in each molding cycle, which is the time taken to cure or set the material, open the mold, eject the part and re-load, as many molded articles as there are cavities in the mold can be produced.

An important mitigating factor in the cost of molds is the availability of the stock molds. Many molders have molds on hand from which they will sell parts to a prospective customer who wants a standard item. The procedure is exactly the same as prevails in the glass industry. There are hundreds of these stock molds in existence in the plastics industry for closures, packages, package parts and other items.* The use of the stock mold does not necessarily preclude brand identification or individual characteristics on the finished item. If the run is long enough, the molder will be glad to adapt the stock mold with a brand name or design, and for short runs the finished molding may be branded or marked by one of the several available processes.

Applied decoration

Designs showing trade-marks may be applied after the piece is molded or during the molding. Sometimes a piece is embossed or debossed in the molding and color later wiped in. Metal inserts may also be utilized in decorating. Roll-leaf stamping, mentioned above, decalcomanias, silk screening and printing are also widely used methods.

The use of such applied decoration has contributed not only to the versatility of plastics as a medium for packaging and for achieving sales appeal, utility and beauty, but it likewise provided, on occasion, a means

* Modern Plastics magazine, 122 East 42nd St., New York City, has a stock mold service which helps buyers find the mold owner for a particular part, provided that the part is available and restrictions on materials and machinery have not limited production.

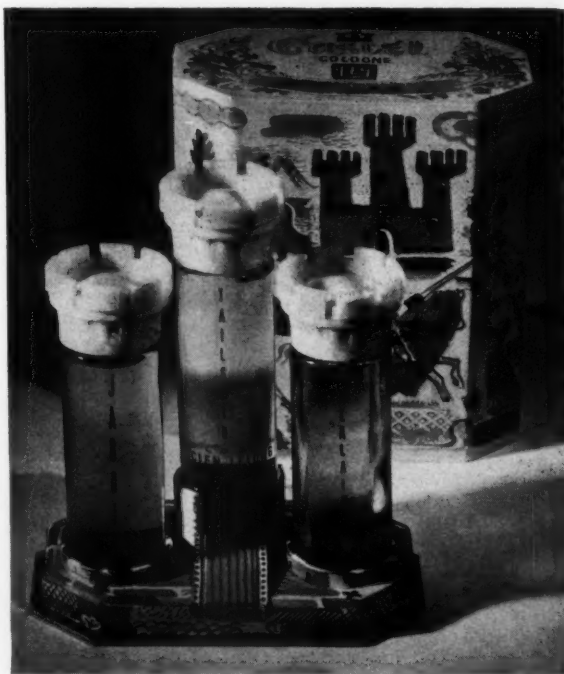
of reducing packaging costs, since such applied decorations are usually less expensive on short runs than decorations formed by the mold itself, since these require expensive mold finishing operations. On longer runs, the cost factor is not so great, and the choice as between applied or integral decoration is more a matter of design than expense.

Drawn and set-up sheet plastics

Several types of plastic materials have been furnished in sheet form for fabricating into packages and displays. These plastics include cellulose acetate, cellulose nitrate, ethyl cellulose and vinyl acetate. They form the many beautiful transparent boxes and displays which characterize so much of the luxury aspect of pre-war packaging. They are fabricated in two ways. They are either set up or drawn, or a combination of these two processes. Set-up containers are made by cutting the sheets and then mounting two or more pieces together to form a package. Fabrication is accomplished by adhesives, solvents, heat, crimping, beading and so on. Occasionally, the edges of these packages are reinforced with wire, and sometimes metal tops and bottoms are used in the larger size containers or where additional strength is required. Occasionally, a transparent plastic top, either drawn or set up, is placed over a paper set-up base in which the merchandise is contained. Thus, visibility and strength are combined.

Of course, the main reason for using rigid plastic sheeting is purely the visual attractiveness—either transparency or, in some cases, translucence. Most of

Cologne castles are topped with decorative, colorful molded plastic closures which resist essential oils in the containers. Special molds are required for such individualized designs.





Transparent plastic sheeting is fabricated into a sturdy dustproof cover for display packages. A set-up paper section forms the base of the box—ideal for cosmetics or jewelry. The clear cover protects contents and attracts sales interest.

the packages are of the transparent type, but later methods of printing and drawing are utilized to give interesting translucent effects, especially in displays. In one process, the blanks are printed first and drawn afterward. Special inks bond the color directly to the plastic and make an interesting "stretched" design under the drawing process.

Cast plastics

The use of cast plastics, which are materials cast into lead molds, can avoid the use of molding altogether. Rubber, both synthetic and natural, may also be used to make molds for casting liquid plastics of various types, through phenolic and acrylic casting resins. They have been most widely used in the display field. Molds are usually made to specification. There is practically no limitation in the size or the intricacy of the profile or shape made by this method. The casting may be machined into sub-section by the use of woodworking equipment, or the casting may be, itself, a finished package part. Liquid resin is more expensive, but the mold cost is cut down considerably. This makes the casting method ideal for the short runs.

Cellulose derivative containers

By a special process, several companies have been manufacturing cellulose vials and tubes. In application and size, these containers have certain limitations. They are used primarily as containers for dry products, pills, tablets, some semi-liquids and petroleum products. They are lightweight and strong, and are integrally

printed with multi-color trade-marks, designs, etc. They may be made translucent, transparent or opaque, and in a wide range of colors. They can be made quite small, but are definitely limited in size to about 6 in. in length and approximately 1 in. in diameter.

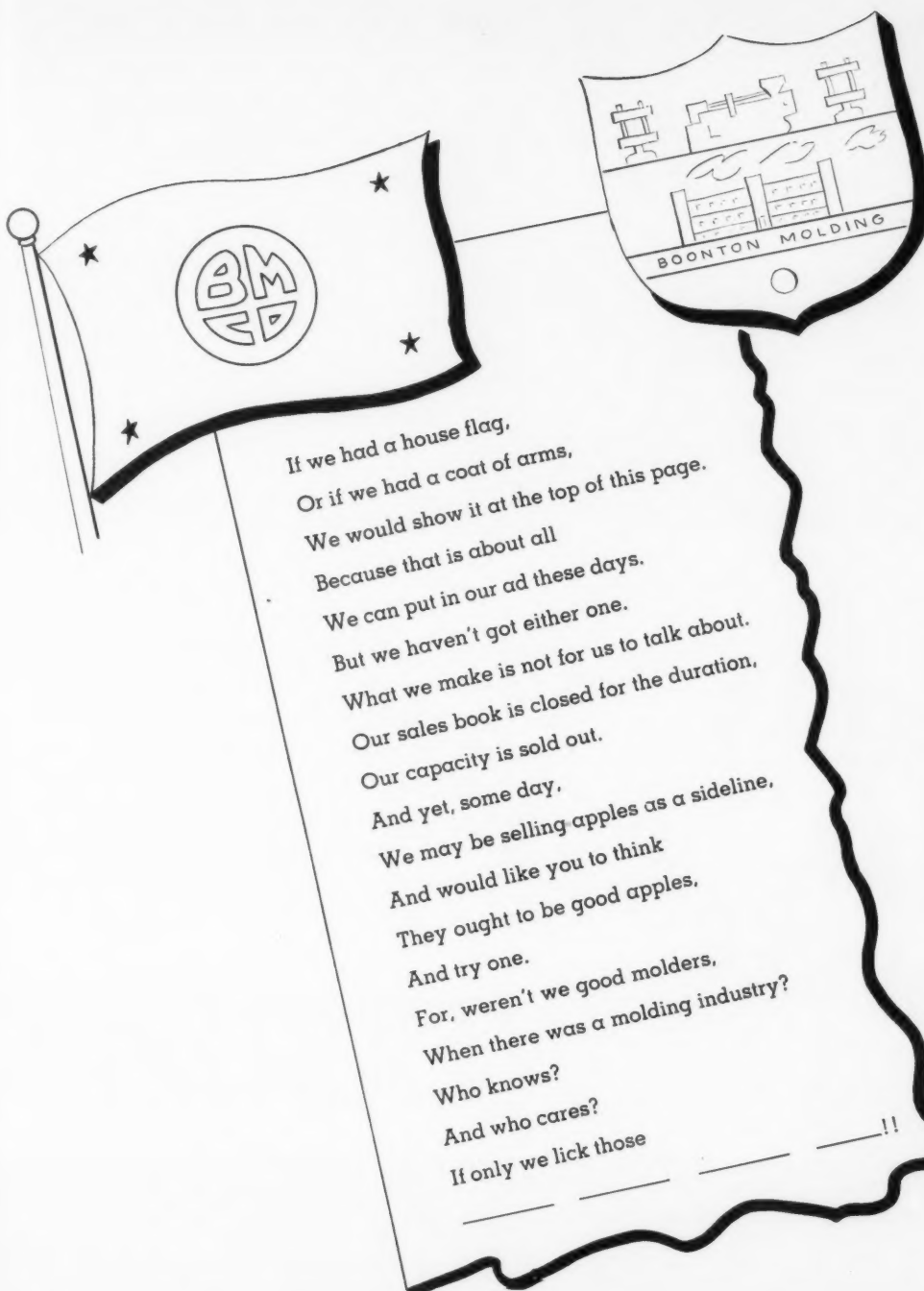
Coatings*

Many different types of plastics, including both thermoplastic and thermosetting materials, are supplied in liquid form for use as coatings on all types of surfaces—wood, metal, cloth, paper, etc. Linings of tank cars, the inside of tin cans, adhesives for weather-proof paper cartons, coating for drawn metal closures are typical applications of liquid plastic coatings. In their dried or polymerized form, they have the same qualities as molding compounds of the same type. (*See properties of plastic materials as outlined later in this chapter.*) Coatings used include nitrocellulose, phenolic resins, urea resins, melamine resin, alkyd resins, vinyl resins, ethyl cellulose, acrylic resins and synthetic rubbers.

Fillers



Plastics are resins and although they can be used "straight," generally the thermosetting materials (special cast plastics) are used with various types of fillers. Sometimes the resin is only a binding or impregnating agent as in the case of certain laminates. Sometimes filler is added to the resin, even forming the bulk of the material. In such cases, we have what is practically a

* See also Chapter XI, Wrappings, Coatings, Laminations.



"A Ready Reference for Plastics" written for the layman, is now in a new edition. If you are a user or a potential user of molded plastics, write us on your letterhead for a copy of this plain non-technical explanation of their uses and characteristics. Free to business firms and government services.



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Set into special sponge-rubber goggles, disks of tough, transparent Eastman Acetate Sheet shield the eyes of tank battalions **TANK GOGGLES**



War maps are covered with Eastman Acetate Sheet . . . regular type for protection—matte-surface type to permit rapid sketching of plans **WAR MAPS**

VERSATILE WAR WORKER

KODAK, holder of the coveted Army-Navy Production Award, is concentrating more than 90 per cent of the greatly extended capacity of its camera and optical divisions upon high-precision war equipment. Two thirds of its photographic film and paper output, largest in the world, is destined for the fighting forces and other essential purposes. Similar situations exist in all of the varied lines of Eastman endeavor. Any brief list can include only

EASTMAN



Forming the eyepieces of noncombatant gas masks, Eastman Acetate Sheet can perform a truly vital protective function **CIVILIAN GAS MASKS**



Used in more efficient filing systems, Eastman Acetate Sheet expedites the handling of papers important in the war effort **WARTIME PAPER WORK**



Eastman Acetate Sheet, encasing identification badges and passes, preserves them, renders them completely tamper-proof **IDENTIFICATION BADGES**



Laid over the finished parts of drawings, or over the completed drafting jobs, Eastman Acetate Sheet prevents costly damage **WORKING DRAWINGS**

examples of Kodak's innumerable direct and indirect contributions to the war effort.

For instance, merely a few of the wartime uses of Eastman Acetate Sheet can be shown on these pages. Its many advantages make this an extremely versatile material. It is highly transparent and particularly tough. It can be scored, folded, pleated, fluted, molded, and drawn, and takes printing inks readily—without wrinkling. Can be sewed, crimped,

or stapled. It cements with an unyielding bond. It does not crack or shatter.

Being "in the service" for the duration, Eastman Acetate Sheet is not now available for general civilian purposes. However, you will want to have it in mind when the war is over. For then you will again find it in the very forefront of modern packaging materials. Eastman Kodak Company, *Chemical Sales Division*, Rochester, N. Y.

ACETATE SHEET

Transparent Packaging Laboratory now devoted to wartime work

Kodak's Transparent Packaging Laboratory, well known in the industry, is still on the job. However, it too has "gone to war" and is making its contribution to the solution of today's problems affecting wartime uses of transparent sheeting. Afterward the help of this special packaging workshop will again be available to all manufacturers interested in the applications of Eastman Acetate Sheet.



different material, taking its physical characteristics from the filler and its chemical characteristics from the resin. Such types are: phenolic sisal plastics, phenolic pulp products, phenolic asbestos composition. Related forms are molded macerated and molded laminated plastics. The molded macerated type consists of a good deal of macerated fibre or textile, impregnated and surrounded by a plastic resin, usually phenol-formaldehyde. Such a composition when molded has extremely good tensile and impact strength. Molded laminated plastics are also known as phenolic resin board and blanks. Before molding, the piece is punched roughly to shape (pre-formed) and then placed in a mold where it is cured. The blanks themselves are made on paper-making equipment of resin and various fibres.

There are many extenders of plastics which are used either to change the physical characteristics of a resin or to decrease the cost by filling the comparatively expensive resin with a relatively inexpensive extender. These extenders are of many types. Lignin, for instance, comes from the waste products of the lumber and paper industries. Bagasse is derived from sugar cane after the sugar has been extracted. Diatomaceous earth is a volcanic mineral which is mined. This filler has many fine characteristics. Asbestos is also used as a filler for plastics, and so are woodflour and walnut shell flour.

Extenders may be divided into two categories: organic and inorganic. Since the organic fillers are lighter in weight, they are used much more widely in plastics than are the inorganic extenders although inorganic fillers are the subject of more and more research. Already one has been announced—silicones—creating a plastic in liquid form capable of withstanding temperatures up to 500° F.

Solvents and plasticizers

The thermoplastic materials are pure resin and pigment, various types of solvents and plasticizers—special chemical formulations—are added to them to make them more easy to mold. The solvent or plasticizer used may affect the color characteristics as well as the odor and the chemical reactions of the finished plastic piece. They also affect the physical hardness and softness, impact and tensile strengths of the finished molding.

Design considerations

If an article requires strength throughout, there are several methods of securing it. Domed or hemispherical shapes are stronger than flat-topped ones. Fillets at corners or filleted ribs are advisable. Extra thickness of material at points of stress may be obtained by beading or reinforcing ribs. Attachment or assembly inserts should be at filleted corners if at all feasible. This helps to eliminate "flow marks." Some other design considerations are: Shapes that call for loose sections in a mold, to obtain undercuts, should be avoided if possible for economical molding. Small side holes can often be drilled and large ones continued to the top to draw straight. Ribbing can be used to hide "flow

marks" under the hole. Threads can be molded with great accuracy and held to close tolerances. Very sharp edges may be obtained, but are generally inadvisable from the handling standpoint and it is best to "break corners" slightly. Sharp-edged lettering sometimes causes sticking in the molding operation. Round edge lettering will definitely assist in eliminating this possibility. Depressed lettering and design in plastics mean higher die cost than raised lettering. When debossed lettering is most desirable, it is best to employ a narrow style if such lettering is to be wiped in. Double or triple line lettering is better for wider letters because it fills better and there is less likelihood of the pigment being worn off. "Low" bas-relief designs and letters catch highlights as well as do high relief decoration, yet are more easily kept clean.

Generally speaking, anything that can be engraved in steel can be molded on the surface of a plastic piece. Incidentally, the field is still wide open for smart use of other materials as components of the plastic piece. Leather (real or imitation), wood, rope, canvas, cloisonné, printed papers, cork, laminated materials, glass, reed, fabrics, all can be combined with plastics for new and strikingly unusual effects. Actually, so little has been done along this line that it does not seem unreasonable to predict that a swing in this direction would result in increased sales of so many luxury items.

Manufacturing methods

There are various manufacturing methods for handling plastic materials. The following are definitions of these.

Compression molding: This is done generally on hydraulic compression presses with one movable and one fixed ram. Plastic in powder or pellet form is inserted into the female portion of the mold and this is usually raised by hydraulic pressure against the male section. Heat is applied simultaneously, causing the plastic material to flow to the shape of the mold. When the mold is opened, a cured plastic molding is ready for finishing.

Injection molding: First imported into the United States in 1934, injection-molding machines are basically units for heating plastics into liquid form and then injecting them automatically into cool molds where they set. Used until recently only for thermoplastics, they now handle thermosetting materials as well.

Mold making: Molds are made from various metals, ranging from some comparatively soft metals to the hardest tool steel, depending on the length of service and the amount of molding pressure necessary. In making molds considerable skilled hand work is required. Duplicate cavities and duplicate molds can be made in softer metals which can later be heat-hardened. Hobbing presses and duplicating machines are mechanical means for the purpose. Electro-formed molds, made by a special electrolytic process, have also been perfected and are expected to play a part in decreasing mold costs.

Extrusion: Extrusion of plastic materials is the forcing of molten plastics through a die of any desired shape to achieve a continuous length strip of the profile of the



Today we work for VICTORY and plan for peace and the future. Our personnel and facilities are occupied with the grim business of war. Our skill and experience that developed the production of peace-time products to a fine art are now contributing to the protection of our country. We are solving new and unprecedented problems, and are successfully coping with the challenge of making plastics a more than adequate substitute for strategic materials.

When this war is over, Plastics will really come into their own, having proven themselves beyond expectation. Post War activity will demand and use the developments in materials, techniques and design that are arising out of our present defense accomplishments. Now is the time for foresight, for the planning of products for the future. Now is the time for VISION. Our Art, Engineering and General Plastics organization is at your service. Let us help you with today's problems and tomorrow's plans.

COLT

**ARTISTS
OF PLASTIC
MOLDING**

PLASTICS DIVISION
COLT'S PATENT FIRE ARMS MFG. CO.
HARTFORD, CONN.

die opening. Plastic is squeezed from the machine like toothpaste from a tube, in the desired shape, cooled and trimmed in lengths. This process has many possibilities in the manufacture of packages and package parts. Hollow tubes, solid rods and complicated profiles may all be manufactured by this process. Thermoplastics are especially suitable for extrusion into continuous lengths, and techniques are being developed to handle thermosetting materials in similar fashion.

Lamination: The lamination of materials with plastics used as the binding or impregnating agent results in the production of sheets, rods and tubes, made of wood and resin, cloth and resin, fibre and resin or paper and resin, which can later be fabricated by typical woodworking techniques. The resulting productions are by and large very strong and durable. Sheets of plastics may be laminated with other materials to give fine finish and protection to surfaces or interiors.

These laminated materials can be molded by various low cost processes. One process utilizes a rubber bag in which a vacuum is created, so as to hold the parts to be molded around a form of wood or other inexpensive material. This is then placed in an oven and the laminate is cured. Since entire airplane fusilages and wings are being successfully molded this way, it is obvious that there is a possibility of application to the packaging field. Such large items as barrels and drums could easily be formed by this method. The material is exceedingly strong and resilient since it has the structural strength of wood, or whatever other material is used as the base, plus the chemical resistance and the strong chemical bond supplied by the plastics. Cost of materials is higher than plain wood or coated paper, but the low fabrication cost plus the increased efficiency of the container might overbalance price considerations.

Transparent plastic sheets

Many of the plastics which are treated in more detail later in this section under the titles of ethyl cellulose, cellulose acetate, cellulose nitrate and certain of the vinyl resins are available in sheet forms ranging in

gauge from very thin to quite heavy weights. These are supplied in single sheets or in rolls, depending on the weight of the plastic and the use to which it will be put. These sheet plastics, while embodying the chemical characteristics of their generic groups, have the additional physical properties of being easily handled on semi-automatic and automatic bag and box-making equipment.

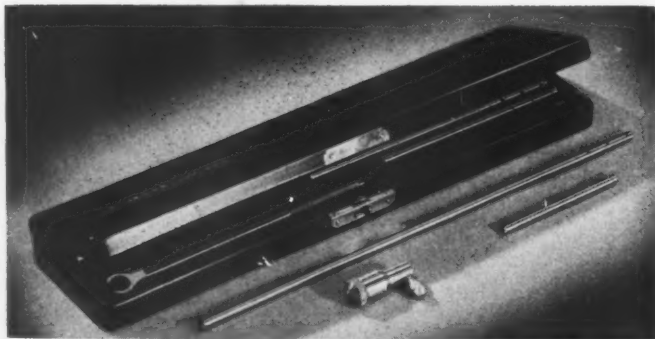
Other plastics, polystyrene and vinylidene chloride, which are exceedingly water- and moisture-resistant and possessed of great strength, are also being manufactured in sheet form and are expected to play an important role in post-war packaging.

Fabrication: Fabrication of thermoplastic sheets, rods and tubes may be accomplished by bending, cutting, crimping, gluing, sawing, stitching or eyeletting, depending upon the desired result. Plastic sheets in thinner gauges may be drawn, too. This term is differentiated from embossing by restriction to processes in which sufficient material flow takes place so that the wall thicknesses of the finished piece are the same as the original sheet stock. It might also be called "sheet molding." All sorts of shapes may be drawn or fabricated—ovals, circles, hemispheres, oblongs and more complicated designs. Generally, drawn containers are restricted to longer runs for the same reason that molded plastics are—a mold cost is involved and must be amortized over the production run.

Finishing operations: Many types of finishing operations can be applied to a plastic part after it has been ejected from the mold. Small pieces may be tumbled to give them a smoother finish and remove the rough edges. Others may be drilled or tapped. One plastic unit may be glued to another piece with a solvent or adhesive. Plastic moldings can be machined on the same type of wood- and metal-working equipment used by plastic fabricators for actual manufacturing purposes.

A number of supplementary operations may be necessary, depending upon design. If the product is a box, hinges and locks of various types may be required. These may be attached by screws, rivets or self-tapping screws.

Left: Molded phenolic case for 8-piece micrometer set, is durable and economical. Material: Durez Plastics & Chemicals, Inc. Molded: American Molding Co. Right: plastic razor for the Army is neatly packaged in a molded cellulose acetate box, saving both metal and weight. Material for razor: Bakelite Corp.; molded: Consolidated Molded Products Corp. Box material: Tennessee Eastman Corp., Monsanto Chemical Co., Plastics Div., and Manufacturing Products Co. Molded by Arpin Products, Inc.



LUMARITH

REG. U. S. PAT. OFF.

Keeps the Marines' "Reinforcements" Fresh

In the tropics the U. S. Marine Corps fights a ceaseless war against moisture and fungous growths, which cause rapid deterioration of many radio, telephone and electrical parts. For spare parts—equipment "reinforcements" ready for instant use—the Marines now have the situation well in hand:

Each part is wrapped and sealed individually in transparent packaging material, then packed in a rigid, transparent Lumarith plastic container, sealed around the cover with moisture-proof, pressure-sensitive tape. Thus Lumarith, the "glamor" packaging plastic, scores again for U. S. military use—delivering vital spare parts factory-fresh on the battlefield.

Lumarith protects against mold and poison gas—is not affected by extremes of humidity or

temperature—is proof against water, grease and germs—does not shrink, dry out or become brittle. The Army, Navy and Marine Corps can find many uses for these qualities in Lumarith containers and tubes for parts, drugs, medicines and foods . . . in Lumarith-backed tapes . . . in boxes, drums and cans with Lumarith-laminated linings. Military needs for better packaging, for use from Iceland to the tropics, offer a continual challenge to the packaging industry.

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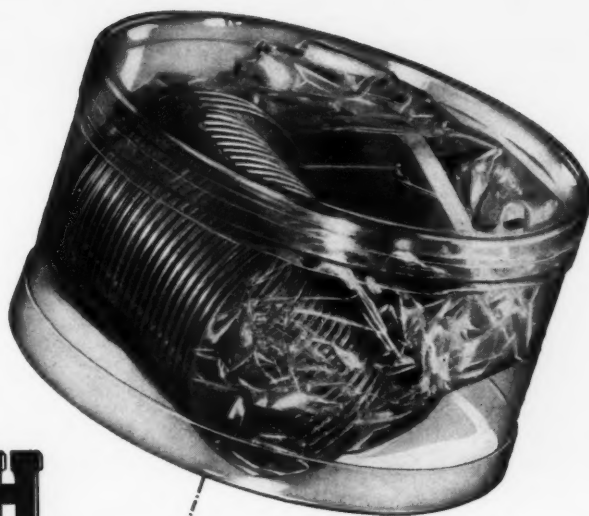
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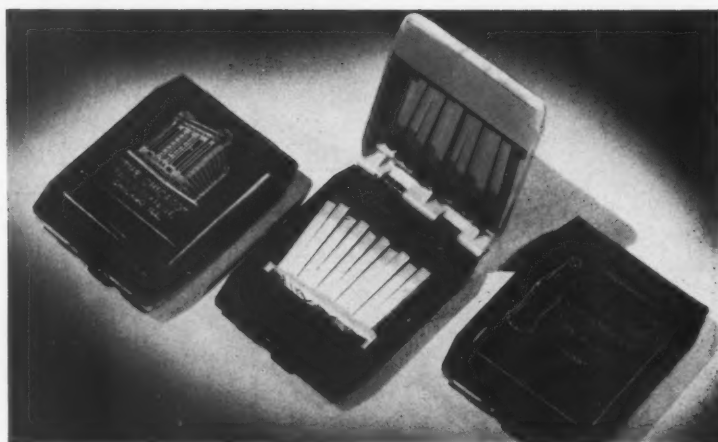
The First Name in Plastics

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PACKAGING CATALOG

277





Cellulose acetate book match case is molded of Cellulose Celluloid's Lumarith. They are economically made in large quantities and colors and can be imprinted or decorated with advertising or trade marks.

A very widely used type of hinge consists of a spring which locks into recesses provided for this purpose in the base and cover of the molded article. The use of this type of hinge requires pre-planning, since the cover pivots upon a groove in the molded base. The function of the spring is principally to hold the cover in this groove and to control opening and closing. Proper planning of the groove and hinge construction can pre-determine the angle of greatest opening—an important factor where the molded box is to be utilized for display purposes. A piano type of hinge made entirely of plastic has also been perfected. It can be included at relatively low cost since it is completely extruded.

Thermosetting molding compounds

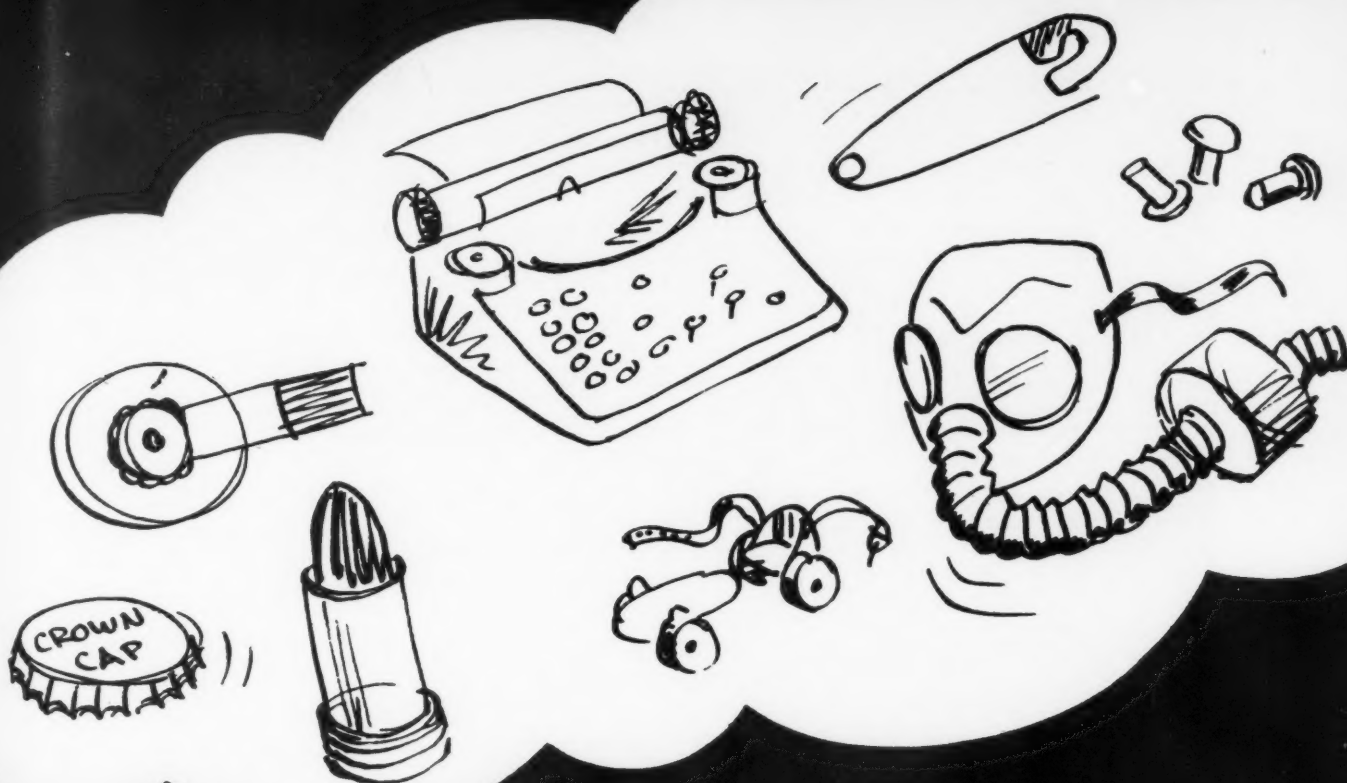
When the phenolic plastics first made their appearance, they found quick acceptance by the buying public. Most people like plastics—a great enough incentive to cause many merchandisers to investigate their use. When they did, they found in phenolic plastic a material that had exceptional adaptability—that could be formed into almost any shape or design—that was available in many colors. The finished articles came from the mold ready to use, with a high lustrous finish that couldn't be washed off, tarnish or rust. They were good insulators against heat and cold and had excellent mechanical qualities such as light weight combined with great strength, resiliency to shock, and of low density. Above all, costs were found to be comparatively low. Users found a few disadvantages which it is well to point out for comparative purposes. Consider closures, for instance: In plastics' earlier days, a standard phenolic material was used which had a slight odor, was somewhat resistant to acids and mild alkalis, had little non-bleeding and bleaching qualities, was not particularly flexible from the molder's standpoint and did not cure fast enough for low cost production runs.

Today the buyer finds none of these disadvantages. Phenolics are available now that are completely odorless; that have great resistance to acids and mild alkalis; that are non-bleeding and non-bleaching. He finds

practically any color except certain pastel shades in the thermosetting phenolics. In the opaque thermosetting group, he finds richer or denser blacks brought about by improved dyestuffs. He finds far greater strength and durability. And from the cost standpoint, he enjoys lower prices in the thermosetting phenolics, because of improvements in manufacturing, molding machinery and more flexible materials. Molding materials have recently been put on the market which may be automatically stripped from the mold while hot—a tremendous advance over former materials. Also, a material has been formulated which has cut down cure time in the press from around 80 sec. to 30 sec. It is quite easy to realize what these two improvements have meant from the cost angle on comparatively large production runs.

Urea formaldehyde plastics of the molding type are available in lighter shades of color not obtainable in the phenolic group. This is because urea syrup, before the condensation process has taken place, which reduces it to powder, is a water-clear liquid. It therefore gives full value to pigmentation, and even pastel shades may be definitely controlled. White and ivory are common in ureas. To the manufacturer whose package depends upon daintiness of color for its selling appeal, urea may be the ideal molding compound, providing, of course, that its chemical properties are suitable to the job. Although higher in price than the phenolic compounds, this advantage of color and translucency is often worth the difference in many applications. Urea moldings are insoluble and inert, resistant to greases, oils and certain solvents. They have no taste or odor, and there is little or no tendency to show dirt even with constant handling.

Ureas have been used widely for tube and bottle caps because their broad range of colors offers a distinctive note of attraction while goods are on display. They are frequently chosen for better harmony with labels than would be possible with dark colors. They are especially suitable, too, for intimate use in the boudoir and bath, and for that reason have found general favor in packaging cosmetics and toiletries.



"SAY-CAN YOU MAKE THIS OF PLASTICS?"

We don't know but we're willing to try!

We receive dozens of inquiries each day for new plastic applications replacing war scarce metals. Most of these problems are tough nuts to crack...many of them, frankly, should not be attempted in plastics at all. We know what plastics will do, and equally important what they cannot do. Our design and engineering departments will be glad to study your problem with an open mind and give an unbiased recommendation as to the best solution in *and* of the

available materials, plastics or otherwise. Often these war changeovers to plastics result in a better product at a lower cost . . . they are worth trying.

Our new plant in Fairfield, Connecticut is now in full production, completely equipped to give you top notch molding in all the plastic materials. We're working harder than ever before in our history, but we are still ready to sit down with you and your problems, both pressing and future. Your inquiries are invited.



Ureas are often used in conjunction with plastics of the phenolic group. Their gay colors contrast pleasantly with the brilliant blacks and dark shades of the other material. Urea covers of ivory or pastel shades create a harmonious ensemble with the smooth lustrous finish of black phenolic boxes and jars.

Urea moldings combine harmoniously with the newer transparent resins. Their rich colorings supply a background of warmth and appeal which accentuate the cold clarity of the transparent part.

Phenol-formaldehyde molding compounds

Oldest of the thermosetting resins and the largest single plastic from the point of volume are the phenol-formaldehyde molding compounds. They have the widest utility. The rate of cure or set can be varied to meet almost any requirement. Their only important lacks are their color instability (in light or pastel shades only) and their opacity when molded. Through a special process they can be molded in a method which is comparable with the injection process used on thermoplastics. Mostly, however, they have been compression molded. They are rather incompatible with other resins and plasticizers. They can be made wholly odorless if desired. They have been widely used in packaging and in the manufacture of closures.

Forms available: As compression molding powders and granules under the following major groups—general purpose, non-bleeding, heat-resistant, extrusion type, high impact, arc-resistant, closure type, moisture-resistant, high dielectric, acid-alkali-resistant, friction-resistant, sanding, buffing type, as liquid coatings and cast forms.

Outstanding properties: Dimensional stability, heat resistance, water resistance, resistance to chemicals, electrical insulation qualities, moldability.

Trade names: Bakelite, Durez, Durite, Heresite, Indur, Makalor, Resinox, Textolite.

Urea-formaldehyde molding compounds

Urea molding compounds have found wide application in packaging. A great advantage of this resin is its color possibilities which gives it appeal similar to the colorful thermoplastics and its immunity to odor, taste and straining. Thus, it has been used on many cosmetic packages and containers for toiletries.

Forms available: Compression molding powders or granules.

Outstanding properties: Unlimited translucent or opaque colors, odorless and tasteless, rigid, shatter-proof surface, excellent light diffusion, low specific gravity.

Trade names: Bakelite Urea, Beetle, Plaskon.

Phenol-furfural resins

Many characteristics of phenol-furfural resins are traceable to the furfural filler, which is manufactured mainly from oat hulls, generally considered a waste product. Phenol-furfural has excellent flowing characteristics and withstands high molding temperatures without

burning. It has high impact and mechanical strength.

Forms available: Potentially reactive one and two stage resins, pulverized. Liquid resins. Fusible resins and varnishes. Modified resins. Molding compounds; various fillers.

Methods of fabrication: Compression molding, positive, flash, transfer and injection molding; laminating.

Typical applications: Bayonet scabbards, helmet liners, electrical parts, closures, etc.

Outstanding properties: Superior moldability, rigidity and permanence of dimensions even at top molding temperatures, also freedom from scorching or burning. Chemical inertness and water resistance. Stability of black and brown colors, heat resistance and electrical properties.

Trade name: Durite.

Melamine resins

First made commercially available in 1939, these resins have much to recommend them. They give excellent wet strength to paper containers, they are fine adhesives, they can be molded into a number of forms with good physical and chemical characteristics.

Forms available: Resins in solid form and in solution. Mineral-filled molding composition. Also alpha-cellulose-filled molding compound and cotton-rag-filled molding compound.

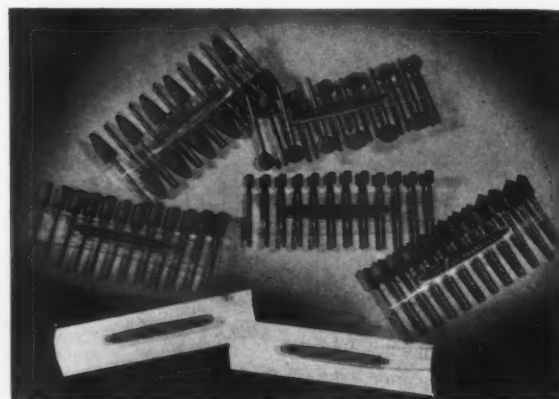
Molding conditions: Direct compression; transfer.

Outstanding properties: Thermosetting, arc-resistant, odorless, tasteless, inert; resistant to hot water, organic solvents, alkalies and weak acids; high dielectric strength, heat- and abrasion-resistant; color possibilities.

Typical applications: Paper impregnation, bonding material for wood, paper, asbestos, etc., baking enamel, electrical parts.

Trade names: Melmac (American Cyanamid), Catalin Melamine, Plaskon Melamine.

Delicate drill heads used in manufacture of military equipment are protected in shipping and storage by rigid transparent strips of du Pont's Pyralin. Light, rigid units hold 12 drills of the same size neatly and compactly with maximum protection. Boutwell Owens & Co., Inc., manufacture packages for The Norton Co.



HERE COMES ANOTHER 20,000,000

WAR WORKERS!

Right off the presses, ready to perform their duty dependably and unflinchingly; a function as important as the front line. For without these closures, necessary foods would perish, vital drugs become contaminated, strategic chemicals assume impotency.

Yet, the value of molded closures does not end merely with utility. Tons of precious metals are routed to the war effort by the elimination of metal from cap and closure applications.

In the post-war era, we'll talk about the beauty, finish and lustre, too, of MACK molded closures. How their high quality, excellence of design and low cost are prime requisites in civilian marketing; how they reduce sales resistance.

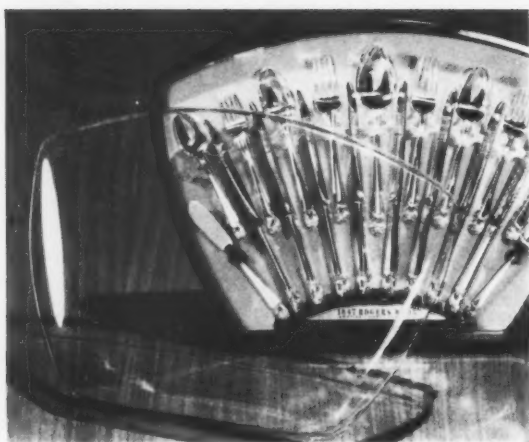
Right now, though, we want to emphasize the part played by MACK closures — millions of them—in helping to win this war. Inquiries should be addressed to Mack Molding Company, 132 Main Street, Wayne, New Jersey.



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The all-plastic silver display chest has a molded phenolic base of black Durez and a hood of rigid transparent cellulose acetate sheet—Monsanto's Vuepak. Brackets molded of transparent Crystalite hold silverware in place. Cover by P. P. Kellogg Co.; base by Northern Industrial Chemical Co.

Thermoplastics

Thermoplastics have the ability to soften under heat and harden at normal temperatures. The molding reaction is a purely physical phenomenon and can be re-enacted indefinitely.

This characteristic enables these materials to be injection molded and extruded, melted and shot into a cool mold for forming; or squeezed through a die of any desired profile.

As a group, thermoplastic materials are colorful, transparent, lightweight and tough. They have proved themselves well suited to the manufacture of closures and of packages generally. Their heat-softening quality, however, precludes their being used where heat in substantial amounts may later affect the molded articles. Within the last few years, many manufacturers have taken advantage of the transparency offered by some of these materials to mold solid transparent packages which offer views of the products before they are opened.

The thermoplastic materials are:

Cellulose acetate

Produced from cotton linters, acetic acid and acetic anhydride; mechanically strong and durable articles with relatively thin cross sections, as in oil cans and other packages, excellent wear resistance and dielectric resistances; unlimited color possibilities, translucent, transparent or opaque in all shades of the spectrum.

Forms available: Compression molding powder, injection molding powder, sheets, rods, tubes, extruded profiles.

Outstanding properties: Mechanical strength, transparency, colorability, fabricating versatility, high dielectric strength, moldability.

Trade names: Bakelite Cellulose Acetate, Hercules Cellulose Acetate, Lumarith, Fibestos, Nixonite, Plastacele, Tenite I.

Cellulose acetate butyrate

Largely similar to cellulose acetate, but with some individual characteristics as: excellent dimensional stability, excellent moisture resistance, good heat resistance right up to the molding temperature, resistance to boiling water and excellent welding properties.

Forms available: Injection granulations or pellets; compression granulations or pellets. Molded objects can be machined with wood tools at reduced speeds to avoid overheating.

Outstanding properties: Low moisture absorption, high dimensional stability, excellent weathering resistance, high impact strength, availability in colors, improved finish.

Trade names: Tenite II, Rexenite, Rexrude.

Ethyl cellulose

Another of the tough cellulose plastics, ethyl cellulose compounds have the important characteristic of low temperature flexibility. They are excellent, therefore, for packages, parts and closures that have to withstand below-freezing cold, while retaining impact strength. Special formulations have been made which have rubber-like properties for uses where high temperature resistance is not essential.

Forms available: Powder form for injection, compression, extrusion. Sheets up to .020 in. thick. Films and foils, continuous lengths, up to .020 in. thick. Uncompounded ethyl cellulose for lacquers, coatings, etc.

Outstanding properties: Water resistance, toughness, high impact, low-temperature resistance, alkali resistance, colorability, dimensional stability, low density, weather resistance, solubility in cheap solvents, good electric characteristics, versatility.

Trade names: Ethocel PG, Ethofoil, Hercules Ethyl Cellulose, Lumarith E.C., Nixon Ethyl Cellulose.

Acrylic resins

More familiar under their trade names (see below) are the transparent polymethyl methacrylates which have found wide use in displays and packages because of their crystal clarity, impact resistance, ability to conduct light around corners, edge lighting, weather resistance.

Forms available: Compression molding powder, injection molding powder, sheets, rods, tubes, solutions, inorganic solvents, aqueous emulsions.

Outstanding properties: Superior transparency, colorability, permanence of dimensions, water resistance, edge lighting, rigidity, weather resistance.

Trade names: Acryloid, Crystalite, Lucite, Plexiglas.

Vinyl resins

Packaging applications are mostly confined to the polyvinyl esters which have many fine characteristics suitable for manufacturing packages and closures to contain products for personal use as well as those for impersonal consumption. A wide range of materials is offered under the various material types and trade names.



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MEETS *Wartime* NEEDS . . . WINS *Peacetime* MARKETS



ETHOCEL SHEETING—Designers' Choice for Widely Varying Uses

Ethocel Sheeting is serving on far-flung war fronts today in practical roles, often pinch-hitting for metals and other strategic materials. It is selected by designers of war equipment for essentially the same reason packaging men turned to it in peacetime: *It endures hardship and punishment to an extent far surpassing other rigid transparent sheeting materials.*

Appreciation of this important fact has led designers to

specify Ethocel Sheeting in applications as varied as those illustrated above—from a tough soldier's sturdy eye protectors to a beautiful package to capture the feminine eye. In each instance, endurance under temperature extremes, permanent transparency and high visibility are required. Ethocel Sheeting meets these requirements. These and other properties discussed on the next page have made Ethocel Sheeting, in War and Peace, a favored material wherever thermoplastic sheetings are needed.

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**CHEMICALS INDISPENSABLE
TO INDUSTRY AND VICTORY**

ETHOCEL SHEETING

Packaging Industry to Benefit from Wartime Developments

Severe Tests Indicate New Uses for Transparent Containers

Wartime requirements for rigid transparent plastic sheetings serve to emphasize the new possibilities that exist for these materials in the packaging industry. Specifications set forth by government agencies and military officials are considerably more severe than normal peacetime requirements. Thermoplastic sheet-

parent envelopes of Ethocel Sheeting are serving to protect shop orders, blueprints and identification cards.

Properties Tell the Story

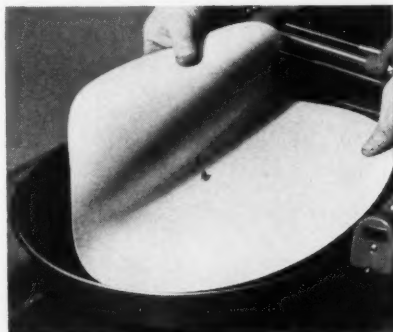
In every test and in every application, basic properties tell the full story of success. Ethocel Sheeting, made of Dow Ethylcellulose, is a tough, inherently flexible sheeting that does not depend upon plasticizers for its ability to take scoring and folding without breaking or tearing, and retains its original properties for an exceptionally long time.



Durable, transparent, Ethocel Sheeting envelopes protect industrial identification cards.

ings must meet difficult tests for low temperature resistance, flexibility, strength and toughness. The results definitely prove that among all rigid transparent sheetings, Ethocel Sheeting is outstanding. They also show that it is adapted to the most varied uses in the packaging field. Combined with advanced fabrication methods, these facts point to an ever expanding use of this material in new markets.

The eye shields, illustrated on the opposite page, are a typical Ethocel Sheeting war application. Another interesting development for military purposes is the use of Ethocel Sheeting for recording blanks. Listening posts record foreign broadcasts on the thin, flexible sheets by embossing. The result is a clear, distinct recording capable of many play-backs. On the production front too, tough trans-



Flexible reference recordings of Ethocel Sheeting reproduce wartime messages clearly and distinctly—capable of many playbacks.

Military men have been most impressed, perhaps, by the ability of Ethocel Sheeting to withstand extremes of temperature. Whatever the temperature zone—in sizzling tropics or frozen north—Ethocel Sheeting remains strong and pliable. It has proven itself in actual tests at temperatures as low as -70° and as high as 250° F.!

Scoring and folding through a beaded edge without cracking is an important advantage of Ethocel Sheeting.

This extra toughness of edge-beaded Ethocel Sheeting provides increased rigidity in many types of fabrications. Ethocel Sheeting is essentially unchanged by continual exposure to light. Its odorless, tasteless and non-toxic characteristics make it particularly suitable for food containers.

Easy to Fabricate

Ethocel Sheeting is easily heat formed by drawing processes, taking cylindrical draws to depths at least two-thirds the diameter. It is readily fabricated by cementing, sewing, stapling, or riveting. These factors, plus excellent printability, make it a favorite material of package manufacturers and users alike.

Strong Appeal for Peacetime Markets

In normal times, Ethocel Sheeting appeals to package manufacturers



Ethocel Sheeting ice cube trays replace strategic metals and other war materials; provide needed item for the home front.

because it is easy to fabricate, reduces rejects and is economical to use. Ethocel Sheeting packages appeal to merchandisers because they retain their shape and do not warp or crack on exposure to varied storage conditions. Finally—and perhaps most important—Ethocel Sheeting creates consumer demand because it is brilliantly clear, can be clearly printed and is adaptable to attractive package designs.

Forms available: Injection and compression molding powders, as well as liquids, rubber-like sheets, extruded tubes, etc.

Outstanding properties: Polyvinyl acetate—clear, adhesive, non-toxic, zero acid number, tasteless and odorless; polyvinyl chloride—resistant to water and chemicals, tough, non-toxic, odorless and tasteless; copolymerized vinyl chloride and vinyl acetate—non-warping and non-shrinking, tough, strong and rigid, chemically resistant, non-toxic and odorless, available in colors.

Trade names: Vinylite Series A resins, Gelva, Vinylseal solution, Vinylite Series Q resin, Koroseal, Korogel, Korolde, Vinylite Series V resin, Vinyon Fiber, Vinylseal Adhesive Solution, Mills Plastic, Veal, Velon, Alvar, Batacite, Butvar, Formvar, Du Pont modified Polyvinyl, Butyral, Soflex, Vinylitex.

Styrene resins

In the packaging field—in dispensing closures for liquors, medicinal and chemical products and the packaging of cosmetics—styrene's inertness and beauty make it a widely chosen material. With its high index of refraction, its variety of colors and its high gloss finish, polystyrene can be used in the molding of packages which present the luxurious effects desired in many fields. The package designers can create color effects that have been unobtainable in the past except at great cost. Easily and quickly injection molded, styrene resins are also exceptionally resistant to heat.

Forms available: Both injection and compression molding powders, also sheets.

Outstanding properties: Low specific gravity, high index of refraction, excellent acid and alkali resistance, excellent water resistance and dimensional stability, low molding shrinkage, excellent molded finish, ability to "pipe" light, high dielectric resistance, transparency.

Trade names: Bakelite, Polystyrene, Styron, Lustron, Loalin.

Cellulose nitrate

Cellulose nitrate is the oldest of the plastics currently manufactured.

Forms available: Lacquers, emulsions, sheets, rods, tubes, chips.

Outstanding properties: It has excellent water resistance, is tough, very colorful but also very inflammable, thus limiting its usefulness. Used primarily for novelties and toys, pencils, rulers, handles, dials, crystals, etc.

Methods of fabrication: Cutting, sawing, drilling, turning, printing, embossing, molding and blowing.

Trade names: Amerith, Celluloid, Hercules Cellulose Nitrate Flake, Nitron, Nixonoid, Pyralin.

Plastics in the war

With the advent of America at war, plastics had already been proved essential military materials. Peacetime industrial uses of plastics became wartime applications under the new situation. And, as heavy industry expanded, and as certain materials became strategic,

plastics were called upon even more proportionately than ever, to fill the new breaches in industry's supply line. Where plastics had been materials considered on their own merits—light weight, moldability, dimensional stability etc., a new criterion was added: Replacement. Plastics began to substitute for aluminum and for rubber, for steel, copper and other strategic materials.

Raw materials production considerably expanded and plans were made for even further expansion, but as fast as production grew, even faster grew the demand for plastic materials.

The results, in terms of packaging, became a shrinking supply of plastic materials. The first materials to go all-out were the vinyls with high dielectric ratings and flexibility. These were required by the Navy for cable insulation purposes and later by the Army as coatings for water-proof cloth for raincoats, tarpaulins, etc. WPB Order M-25, issued in the fall of 1941, set up priority ratings on thermosetting plastic compounds. Through this order, most thermosetting materials, which had formed a good part of the plastics used in packaging, were no longer available except on priorities and limited to strategic applications.

Closures, however, were still permitted and continued to be manufactured but materials began to get scarcer for these applications and extenders had to be employed. These made the finished product softer and took 50 per cent longer to cure. One prominent molder writes, "We have even been thrown out of making soap boxes for the services of phenol-formaldehyde, in spite of the fact that it has an AA-3 priority."

In 1942, thermoplastic materials also came under WPB allocation. Initially, they were not greatly re-

Threaded closures of urea and phenol-formaldehyde, such as these, are molded automatically on compression presses. Photo F. J. Stokes Machine Co.



DUREZ PLASTICS AND RESINS

To fit your Package!

Closures

"Daddy of 'em all"... is what they call Durez 3630 for caps and closures. Pioneer in this field, Durez plastics are famous for these properties: fast cure, lustrous finish, durability, minimum odor and non-bleeding. One or a million... Durez molded closures are uniformly perfect and one-piece molding assures mass-production economies.

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Gloss, durability, toughness, marproofness, chemical resistance, corrosion and wear resistance, gasoline and oil resistance, non-skinning... these are the specifications that have made Durez resins famous. Whatever your "pet" formulation for a coating... from an exterior primer to an interior enamel... there's a Durez resin to make it to perfection!

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Wherever durability and highest impact strength are cardinal factors... Durez 11934 is the plastic for your job. To give it the extra strength not found in general purpose molding compounds, Durez 11934 has a macerated fabric filler and consequently is not readily preformed. Cure cycle is fast for a material of this type. Available in natural as well as black.

Laminated Products

Both high and low pressure types of Durez resins are available as impregnating and bonding agents for laminated paper, cloth, wood veneers, tubes and other materials commonly used for permanent displays. The requirements for these resins are so varied that our laboratories can only determine the Durez resin best suited to your job on the basis of complete specifications.

General Purpose Moldings

Durez 11540 is a molding compound of the highest grade... designed to meet military specifications. It possesses excellent mechanical and electrical strength for molding instrument cases, meter housings, binoculars, cameras, etc. Closely controlled for all properties in manufacture.

For particulars on Durez resins or technical advice and collaboration on your specific problems with Durez research engineers, write to

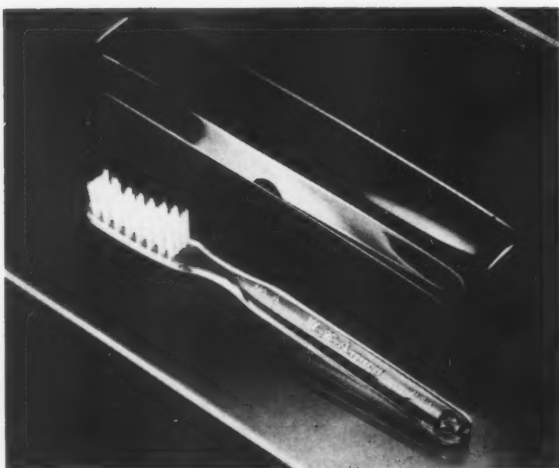
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DUREZ PLASTICS & CHEMICALS, INC.
PLASTICS THAT FIT THE JOB



Toothbrushes for the Army are molded of water-resistant cellulose acetate butyrate (Tenite II). The case is molded of the same material by Insel Co. Photo Modern Plastics Magazine.

stricted from the packaging point of view, but like most other WPB orders, this one will very likely be extended and broadened in application.

Some wartime packaging applications are exceedingly interesting and unusual. A tool box for mechanics' precision tools, a urea-formaldehyde substitute for the former aluminum inhaler, an airplane first-aid kit of molded cellulose acetate, a transparent cellulose acetate lunch box for quick inspection in war plants, a new non-critical gasket material for sealing glass closures to glass jars, these are some of the wartime packaging applications worthy of comment.

An interesting wartime adaptation of the transparent sheet plastic "luxury" container has been made by several companies who now supply these items to various airplane manufacturers. Sub-assembly parts are placed in the containers to protect them against atmosphere and handling, and yet keep them visible.

Plastic collapsible tubes

The elimination of aluminum and tin from collapsible tubes made the search for a substitute imperative. Naturally plastics were considered as a prime possibility and many experiments and much development work have been done along these lines. At present, only two plastic collapsible tubes have been developed, and only one marketed. The one that was marketed, an extruded cellulose acetate tube with injection molded clip, shoulder and cap, was used to market several different products with both aqueous and grease bases. A wax lining was used for the aqueous-based products.

A vinylidene-chloride tube has been extruded successfully, but the shortage of this material will probably force the manufacturer to direct all of his output where it is needed most: into Government hands. Apparently, from what the manufacturer says, the tube is satisfactory

in performance. As to the cost factors involved on both of these items, at present material prices, they are definitely wartime substitutes. However, if, as predicted by many molders, the prices of materials drop so considerably after the war, some of these developments may play a competitive role in the collapsible tube field, providing their physical and chemical characteristics meet prescribed standards.

The great quiet that has fallen on plastic packages during America's all-out war effort is no sign of death, however. There is no doubt in the minds of any plastic manufacturers that the packaging field will be at least as large a consumer of plastics after the war as it was before—and the consensus would seem to indicate that consumption will be on the up-grade in this regard.

The diversion of plastic materials to wartime uses is necessary to help win the war, and no packager begrudges this sacrifice. They have lent their jewelry boxes and compacts to help lick the Axis, while they found temporary substitute packages. Packagers are biding their time until a post-war period when they can take up the trend of plastics where it left off.

The post-war picture

Few plastic molders will commit themselves with as much vigor or definition as the man who is quoted below, but there is fair unanimity of opinion on the post-war position of plastics in all industries, by all industrialists. Certainly, no one expects an eclipse or even a lessening of acceleration in the expanding applications of plastic materials. Rather, the opposite.

One molder says: "With the low price which styrene is going to have in the future, and the enormous quantity we expect to find available, that probably is going to be the most popular thermoplastic.

"Naturally, with the huge chemical productive facilities we will have after this war, the prices of all our plastic raw materials are going to be down low enough so that packaging will compete within their range."

It is safe to say that every materials manufacturer has at least one or two new resins in the development stage in his laboratory. Some of these are, or would be, commercially useful, but manufacturing facilities are not immediately available during the war, and their real application would have to be suspended until such time as free manufacture once again is operative.

Some of the materials on which full, or fragmentary reports have already been released, are as follows:

C. R. (Columbia resins): This is a broad family of chemical compounds containing carbon, hydrogen and oxygen. They are thermosetting in character, but have many fine color and optical possibilities not usually found in thermosetting resins. They are supplied in a monomeric liquid form, and also as cast sheets and laminates. There are a number of compounds under the C. R. classifications each designated by a number.

Silicon Plastics— The Dow-Corning Co. has been mentioned as the manufacturer of a new type of plastic material which, it has been reported, resists heat up to

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THIS IS WAR-



ON THE HOME FRONT

Several million sturdy eye pieces for Civilian Defense gas masks are being fabricated from Vuepak. Here top transparency and good resistance to age and weather are essential.

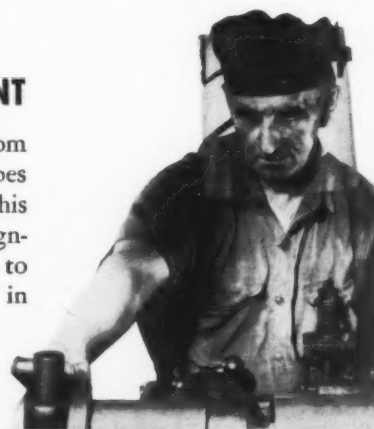
ON THE FIRING LINE

Eye-shields of colored Vuepak fabricated by [redacted] are protecting desert troops from glare and the sting of wind-driven dust and sand...Goggles with interchangeable lenses of Vuepak which [redacted] has treated to improve optical properties are standard equipment for many troops of our mechanized army, air force-para troops and Navy.



ON THE INDUSTRIAL FRONT

Blueprints for victory are safe from dirt and careless handling in envelopes of clear, sturdy Vuepak...while this ingenious face shield of Vuepak designed by [redacted] is helping to prevent many a lost-time accident in vital industrial plants.



TIME VUEPAK

You'll find it a Better Material than ever for Post-War Packaging!

CLEAR and transparent, yet sturdy and rigid, Vuepak has helped scores of manufacturers find new and effective solutions to many a vexing peacetime sales and packaging problem.

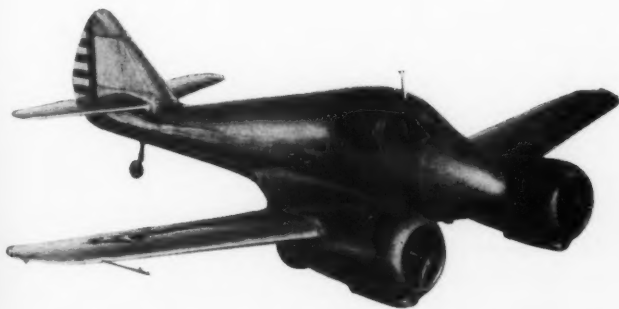
Now it is helping win a war in scores of unsuspected ways—from the home front to the firing line.

And in the process of fitting Vuepak to its new war-time jobs, Monsanto research has produced even tougher, stronger materials with equal or better transparency than

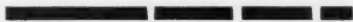
the peacetime Vuepak you knew.

In these photographs you see some of the vital jobs now being filled by the new Vuepak. In the increased surface hardness and all-around toughness required for these jobs you also see the promise of even more effective solutions to still more vexing *post-war* sales and packaging problems.

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Springfield, Mass.



IN THE AIR

New formulas have been developed to produce better cellulose acetate sheets for military aircraft like this  and the thousands of gliders which are now being built for our new army on wings. Lessons learned here will make for an even better post-war Vuepak, too.

500° F. This material, which is a combination of organic and inorganic chemicals, is known in its several forms as "silicones." As the first plastic to incorporate silicon, an element found in glass, the material is expected to have many unique properties.

Nylon—This material, so often thought of as a textile used in women's stockings and parachutes, is not so generally known as a molded plastic material. It has fine heat resistance and many other useful properties such as low water absorption, high tensile strength and extreme toughness. Like other thermoplastics, it has many color possibilities.

Allyl alcohol—This is another plastic development from which great things are expected when this material is released for consumption during the post-war period.

Vinylidene chloride—Here is another plastic with the highest moisture-vapor impermeability yet discovered in any of these materials. Like many other plastics, its possibilities for post-war development are extremely broad, and it may well see service as bags, wraps and other types of packages with a special emphasis on packaging hygroscopic products such as dehydrated foods which are expected to play so large a part in post-war food processing.

For every application and every industry which has been deprived of plastic material for civilian use during the war, there will probably be twice the amount of plastics available afterward. The same wartime demand which took plastics away had the effect of increasing the total volume of raw material production within the plastics field. This can only result in a greatly increased supply of the materials after the war. Too, the molding and fabricating, laminating and extruding facilities which were also commandeered by the war had also to be expanded to take care of wartime demand. This increase in manufacturing capacity also bids fair to sharpen the already keen competition among custom manufacturers of plastics for post-war business. A greatly increased supply of both materials and facilities and a consequent whetting of competition mean an inevitable lowering of price.

New production techniques

Other factors will also tend to bring plastics down in cost and thereby broaden their economic base and their use in all industries, packaging included. Newer and better types of molding, fabricating, extruding and other equipment are either ready now or are being developed to the stage where they will be available as soon as peace is declared. Already the injection molding of thermosetting plastics has opened new fields of use to these widely used materials. New methods of injection molding are already in existence whereby the amount of material molded per cycle is measured in pounds and no longer in ounces. This immediately puts thermoplastics in a position of competing on a manufacturing basis in fields which they had never before touched. It is conceivable, for instance, that crocks, cans and similar containers for shipping liquids may be injection molded after the war. Molding at pressures ranging

from zero p.s.i. to 15 pounds p.s.i. with new polymerizable resins is another of the great technical development possibilities for post-war plastics manufacture. At a recent convention of the Society of Plastics Industry, a leading technician predicted an increasing use of the low-pressure resins in the field of lamination. This would do much to lower the cost of the process and therefore cut the cost of the resulting article, which could be a barrel or drum, or almost any size or shape package desired.

Another important technical development which should play a great role in post-war plastics manufacturing is the "heatronic" molding of thermosetting materials. This process electrostatically heats the materials by the use of high frequency current. Through this method, curing time is shortened from one-tenth to one-half of the time required by former methods. Also, more uniform heating results in a more perfect cure and therefore more reliable molding. It opens up the possibility of molding thicker sections of thermosetting materials than were ever practicable before; it short-cuts a good deal of tool making and saves working hours by increasing the number of cycles per man per press.

Post-war possibilities

During the war, it will naturally be confined to wartime applications where it is most needed, but after the war it should be a potent factor in broadening the base and lowering the cost of thermosetting molding materials.

The extrusion of plastic materials, which has grown so rapidly in the last few years with the development and adaptation of thermoplastic materials to the process, and the development of new types of extrusion equipment and techniques will probably continue their rapidly ascending curve. Extrusion, even during the war, had proved itself capable of producing, economically, parts of such types of packages as lipstick holders and others whose shape allows of continuous length extrusion. Like other plastics manufacturing processes, extrusion is breaking the twin shackles of machine and materials limitations which had confined it in its infancy to few applications. The trend in extrusion is also toward expansion in size and perfection in technique, both of which, combined with the forecast decreased prices in materials, will open new fields of application.

Although originally confined to thermoplastic materials, extrusion is now reported possible with thermosetting materials and actually has been accomplished in both England and America. This is another aspect of the possibilities which will bear post-war watching.

Lamination of plastics and wood, plastics and paper, plastics and cloth, have all undergone marked expansion and growth during the war, and it may safely be anticipated that these, too, will play a part in post-war plastic packaging plans. Several methods of molding plastic plywood with inexpensive equipment may offer a number of possibilities for this material in the manufacture of barrels and drums. This is particularly the case as to low-pressure molding and laminating tech-



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Before Pearl Harbor we gave you highly decorative "Sales Appeal" containers. Now, along with the rest of the nation, we have gone to war. Today, decorative display in packaging is secondary.

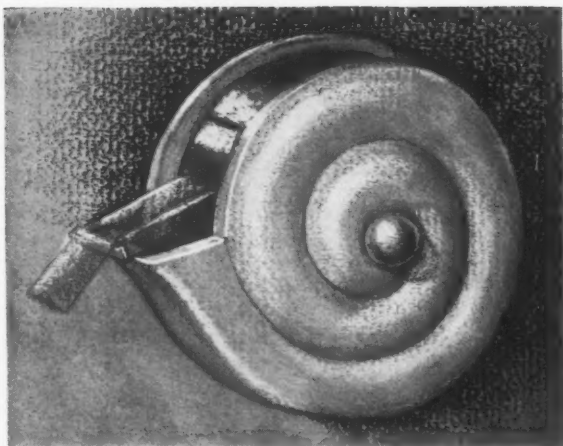
Functional Protection is essential so that, in spite of shortages, the consumer may still get the whole goodness of your products. Yes, our efforts are largely devoted to war work, but we still have available capacity for essential civilian containers.

METAL, PLASTIC, FIBRE, all have their permitted uses and their proper places in all-out war production. We can offer you all three. New packages which were never dreamed of in yesteryears are now in quantity production.

Our complete packaging service is at your disposal.



GEO. V. CLARK CO., INC., 42-26 13 ST. LONG ISLAND CITY, N. Y.



Post-war production will see this shell-like dispensing gadget for cellulose tape. It is now designed for the future and is to be molded of urea-formaldehyde in pastel shades. Photo Plaskon Co. and A. H. Van Doren and Associates.

niques. The fine insect- and weather-resistance of the laminated plastics will no doubt add to the future acceptance of these forms.

One could say "plastic coatings had only been scratched before the war" without making a pun. One of the basic applications was the coating for beer cans, a thermoplastic vinyl compound which could withstand the pasteurizing demands of beer processing, but was not adaptable to the higher heats of food canning. With the rubber scarcity and with the supplies of certain natural resins in far-off places of the world a hazardous source of supply, plastics were called on to fill the coating bill and responded nobly to the task. All sorts of coatings were developed to resist moisture and fungi for non-toxic food bags, for high heat resistance, for use on raincoats and many other applications. All of the qualities which were built into plastic resin coatings during the war will be released for peacetime industry, and packaging stands to profit by them.

Home-made plastics

An important trend which many packagers have noted for post-war consultation is the development of self-contained plastics manufacturing equipment. After the war it will be possible for any packager whose production is large enough, to buy his own automatic, self-contained equipment for injection, compression or extrusion molding. All of these machines are of the type that plug into a light socket and are ready to go to work. The expense of the equipment and the economic advisability of installing it, plus the necessity of building a trained technical staff, are bookkeeping calculation which the individual packagers will have to make for themselves. The point is, the equipment will be there and available for purchase. This fact will have an additional price-lowering effect on molded plastics, since, if a molder is not cooperative on price, a packager will always have a weapon to hold over his head—that of buying his own equipment.

Much equipment was being developed before the war



Though production is halted on this vitamin pill dispenser, it indicates the nature of things to come. Container by P. P. Kellogg & Co., Div., U.S. Envelope Co. Rigid transparent plastic sheeting by Monsanto Chemical Co., Plastics Div.

began, to expedite the fabrication of plastics from sheets, rods and tubes. The biggest amount of development work was being done on sheet materials, and several companies had developed automatic or semi-automatic equipment to manufacture both drawn and set-up containers and displays from sheet plastics. With the influx of new types of sheet material with more protective possibilities, it may be expected that packages fabricated from sheet materials will be employed in many applications formerly not considered possible. The new fabricated plastic packages may well be used for foods as well as for the luxury products and display purposes which formerly consumed the bulk of this type of plastic container.

To sum up: The future of plastics after the war probably will be measurably greater than their past achievements. They will not take up where they left off. They will start steps higher and sizes bigger than the point at which they were cut, more or less, for the packaging picture.

Economic factors will be responsible for the increased post-war use of plastic materials. It is generally agreed that the prices of plastics will go down in varying degrees, depending on factors enumerated, i.e., the competition of new materials, the lowering of cost of expanded raw material plant facilities and the necessity for keeping these operating. Other factors will be lowered fabricating, molding and other costs, because of increased efficiency learned in tough wartime applications and also because of expanded press and machine capacity; the competitive threat of self-contained equipment and, added to all of these, the new knowledge which both materials producers and plastics manufacturers have gained through the enforced conversion to war. Plastics which have made shell noses, tank parts, airplane turrets, gas masks, raincoats and tents, parts of P-T boats and submarines, bugles, helmets and a thousand-and-one other wartime items will, therefore, be better adapted to the packagers' requirements when peace comes. Keep an eye on plastics after the war!

ADHESIVES

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Adhesives and the War Effort

WARTIME shortages and restrictions have seriously affected the adhesives division of the packaging field as well as its every other phase. Many materials once thought to be indispensable in the manufacture of adhesives—particularly imported items—are now either wholly unobtainable or are under strict priority regulations. Substitutions of domestic materials are being made and the formulas and uses of the product generally tailored to meet the new situations.

Here are a few of the outstanding facts as they appear in a survey conducted recently:

1. Packagers of materials for the armed forces, having top-notch priority ratings, find themselves generally able to obtain what they need about when they need it.
2. Producers of essential civilian needs, such as foods and drugs, get good second choice at restricted materials and first consideration for all substitutes.
3. Non-essential civilian production requirements have been greatly decreased due to preceding shortages which have already reduced the demand both for packaging and things to go into the packages. The substitutes seem to be meeting the industry's demands.

Wartime adhesives must perform better than their predecessors. The glamour package with boudoir appeal is out, and utility is the only consideration. The ingenuity and experience which the industry gained in the development of the fancy package, however, are being employed to get that high degree of wartime performance now found in water-proofness, grease-proofness and moisture-vapor proofness of the wartime product.

Shortages and their substitutes

Rubber and rubber-like synthetics are definitely short or wholly out of use. They are replaced by resinous products which are doing the job satisfactorily.

Solvents, such as benzol, toluol, vinyl alcohol, etc., are in a precarious situation, but less critical chemicals are meeting the requirements.

Plasticizers are short—including castor oil, tri-cresyl-phosphate and the like—and substitutes are being found by the industry.

Tapioca, classic base for many adhesives, is no longer imported and domestic starch-producing vegetable products are being used.

Polyvinyl acetates were the first choice to replace latex materials, and sufficed until restrictions were imposed. Ethyl cellulose materials were then used until further restrictions cut them out entirely for civilian purposes. Requirements for gluing cellophane packages have been automatically reduced with the restrictions in the use of cellophane. The same drop in demand is true in the case of aluminum foil and other special fancy wrappings which require the use of critical materials.

Cooperation in the industry

One factor which is coming interestingly to the fore is the tendency of men and firms in the adhesives field to assist each other. Cooperation seems to be the keynote—stimulated by the Government's hint that this is necessary. The ODT's insistence upon the elimination of "cross-hauling" is doing much to localize many market areas. Packagers who may find themselves referred to firms closer to home by their former distant sources should not be surprised. Nor should they resent the substitutions in formulas necessitated by wartime shortages. Adhesives manufacturers realize that the proof of their product lies in its wartime performance, not in sales literature claims, and in few industries do the laboratory "orchids" suffer more in field performance than in the case of adhesives. They must produce to remain alive.

Most gluing machinery will accept the new adhesives, though adjustments may be needed either in the machine or in preparation of the stuff for use. There may be slight difference in viscosity or plasticity, requiring a greater or lesser amount of water or other customary solvent. A little care and patience will remove most difficulties, however, and the gluing, pasting and labeling machinery will be found to work just as well as before. Because of differences in formulas, some wartime adhesives may take a little longer to set. Packagers and laminators must realize this and condone the fact that production speeds may necessarily have to be reduced. This is especially true in the case of some of the new water-proof adhesives. The packager who insists on the same service as before the war will soon discover that nowadays he must take what he can get—and like it.

Wartime adhesives are standing tremendous abuse and glues have been developed that have the widest possible latitude in moisture and temperature tolerances. New specifications in fabrication of laminated materials, as well as sealing, are being met successfully in spite of restrictions and the shortages. Weather-proof cases are standing up under temperatures from minus 40 to 160° F. and the adhesives hold cases together after long periods of submersion in the surf.

One thing many adhesives men are talking about, it must be noted, is a difference in some of the Government's specifications recently put forth: Products are required to do a certain job under certain conditions rather than, as previously, to contain specific materials. This puts it definitely up to the manufacturer and places a premium on ingenuity and ability to devise new ways and means. It also enables adhesives firms to produce good merchandise long after customary supply sources have been frozen.

Technical Aspects of Adhesives

by Dr. F. C. Campins

TO handle effectively the wide variety of adhesives in the day-to-day jobs of modern packaging, the consumer should have a clear picture of the basic principles that decide the proper selection and manipulation of those glues to give the package its necessary "shelf life."

An adhesive is a material in liquid or soft plastic condition for purposes of application, capable of changing to a semi-solid jelly or to a hard film of high cohesive ability and suitable bonding power.

A good bond between two surfaces means, in general, that the fabric or the material must be torn or lifted if an attempt is made to pull the surfaces apart. This is naturally relative and depends on the materials treated. (See Table 3.) Since the fibres of certain papers are easily torn, the adhesives may be low in tensile strength and still give a fabric-tearing bond, whereas the same adhesive, used between two pieces of bond or parchment paper, may not work.

Responsibilities of the adhesive

In addition to bonding the surfaces so they will stand up under the field requirements of package life, climatic variations, etc., the adhesive must permit of ready operation in the applicator and develop a preliminary bond at a sufficiently rapid rate to permit full production on the machine.

Chart No. 1 shows how the adhesive manufacturer arrives at a commercial recommendation, at all times basing his choice on the ability of the adhesive to meet

its responsibility. Further, if only one or two adhesives are available for some very unique surfaces, then clearly, if the job is to be materialized at all, these products would have to be used, even though that may mean compromise in or relief from other requirements. Thus, on new developments, the combined cooperation of the package machinery builder, the paper or sheeting supplier, the adhesive manufacturer and the production manager should enable the several requirements to be so adjusted as to make for ultimate success.

Each successive zone shown in Fig. 1 should be considered to develop the viewpoint and perspective that will lead to efficiency and effectiveness in the day-to-day use of adhesives.

Types of adhesives and types of adhesion

Referring back to the definition given above for an adhesive, several features all important to the user of adhesives are brought out as follows:

At Application For activation or prebonding <i>usually in the gluing mechanism</i>		In Final Bond After fully adjusting <i>itself to room conditions</i>
<i>The Adhesive is</i> Liquid or Soft Plastic and Has Flow	Changing to	<i>The Adhesive is</i> (Semi) Solid Lacks Flow
To permit its application in a thin film		To achieve a permanent bond

The operator is concerned *not alone with the application*, but also *with the initial stages of bond formation (preliminary setting)* whereby the freshly bonded package may be handled even though the adhesive may take a more or less considerable time to adjust itself fully to its surroundings.

It is also obvious that the extent of *preliminary setting* required of an adhesive *will vary* from job to job; in fact, in some elementary cases the "initial tack" of the adhesive is sufficient. Also, as the requirements at application are usually diametrically opposite to those at preliminary setting, all possible provision should be made at the application stage to facilitate or expedite setting.

To play these stages against each other properly it is necessary to know the *means by which adhesives change from the liquid to the solid state*. Thus:

The Mechanisms of Setting	or	The Methods by Which Adhesives Change from the Liquid to the Solid State	are	by	Change of Concentration of a Volatile Liquid Ingredient	&/or	Change of Temp.	&/or	Change of Chem. Comp.
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These processes serve to classify adhesives (see Table 1). Thus:

All Commercial Types of Adhesive	are	"Solvent" Adhesives	or	Cements Temperature Sensitive Cements	Chemical Cements
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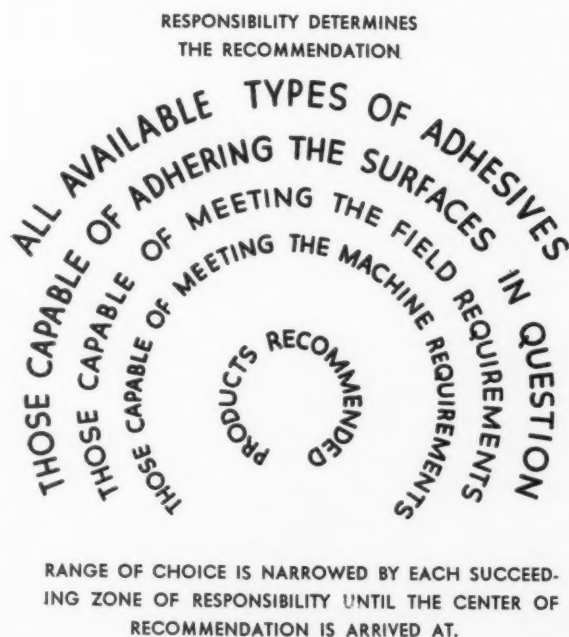


Fig. 1

There are no sharp boundaries between the types and often one or several of the methods of setting may be exploited: and thus the real job of successful application always keeps the setting process clearly in focus so as to secure the maximum rate of setting.

Both these types of adhesives develop final bonds between the surfaces that fall into two classes: (Table 2).

- 1) Where the adhesive film finally sets in a plastic mass, usually pliable; this is called a *plastic bond*.
- 2) Where the adhesive film finally sets into a hard glassy material which may break when the bond is bent, but which continues to supply a film *across* the surfaces, being anchored into or between the fibres, forming a *penetration or mechanical bond*.

There is an interrelation between these two types of adhesion, because all adhesives in the preliminary setting stage give a plastic bond. Thus, many cold vegetable adhesives, after sufficient (preliminary) setting to hold the surfaces together, make a plastic bond which, in those cases where the adhesives finally dry out to a hard, brittle condition, must be replaced by a penetration bond. These conditions are shown in Fig. 2.

Capabilities of adhering

Adhesion generally occurs between the surface layers. Therefore the adhesive bond should not be held responsible for failures due to discontinuity of structure, cracks, zones of low tensile strength, etc., below the surface. Examples include paper surfaces with a loose clay coating, loosely bonded over-coats, with glossy coats, etc.

In some cases it is possible to work through this false,

unreliable or difficult surface by dissolving or melting it away through the adhesive, but these procedures naturally slow up the bonding process.

The adhesive should wet the surface to which it would subsequently adhere. This is necessary not only to spread a thin continuous film, but probably also to establish whether or not those affinities exist which seem absolutely necessary to effect permanent bonding.

The adhesive must preserve continuity across the surfaces to be bonded. (If it also preserves continuity along the surfaces it may have added value for developing grease-proofness, etc., but this is not necessary for adhesion.) This means that:

(a) The surfaces should be brought together while the film of glue is active (i.e., liquid, semi-solid or soft plastic), and in general held together until the semi-solid condition has developed in the glue film, so that it can successfully overcome the tension that may be imposed due to resiliency of the flaps, etc.

(b) The adhesive should not be a crystalline but rather a colloid type of material.

(c) Porous or absorbent surfaces necessitate controlled penetration of the adhesive between the instant of application and the time when preliminary setting occurs; that is, the properties of the adhesive must compensate for a counterbalance the properties of the surfaces. (See Fig. 3.)

The adhesive bond must have a tensile strength equal to or greater than that of either of the materials bonded. Thus, the strength of adhesive is keyed to that of the material. In other words, an animal glue of high tensile strength

TABLE 1.—CHARACTERISTICS OF ADHESIVES

A. SOLVENT (Liquid-Activated) TYPES: (At least one of the surfaces being adhered must permit the diffusion of the volatile liquid ingredient which usually plays no part in the final bond)			
AQUEOUS PHASE CONTINUOUS		NON-AQUEOUS PHASE CONTINUOUS	
Aqueous Adhesives that are true (or nearly true) solutions	Colloidal Solutions		
	Of materials that dissolve and usually have an affinity for water. Usually viscous	Dispersions or Emulsions of materials that have little affinity for water, in water or in other aqueous adhesives. Usually thin	
Slow drying Vegetable Adhesives	Commercial types are:		
	Most Aqueous Glues Vegetable Silicates Many Cold Protein Glues Gum Arabic	Latex Adhesives* Specialties with Milky Appearance (* Products not available are included for completeness.)	"Cellu-Gums" Clear lacquer adhesives for transparent sheetings Wax Gums
B. CEMENTS: (Both faces may be impervious to all vapors from solvents)			
THERMOPLASTIC CEMENTS		CHEMICAL CEMENTS	
Aqueous Types	Non-Aqueous Types		Synthetic Resins (Polymerization or Thermosetting Types)
Commercial types are:			
Some Flexible Animal Glues (where loss of water not necessary to the final bond)		Hot Melts	Synthetic Resins



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when used to join paper together cannot possibly develop a stronger bond than the strength of the paper. Or any adhesive used to join metal to itself cannot possibly develop as strong a bond as the metal because no known adhesive is that strong in itself.

Thus, under ideal conditions where the two freshly adhered surfaces are kept (under pressure) in tension-free contact for a prolonged period these generalizations guide us in evaluating their capability of adhesion, but even under these conditions, the failure to adhere, called *final failure*, will sometime occur. *The causes of final failure can well be examined at this time.* (These must naturally involve violations of the generalizations.)

Common causes of final failure

For "Solvent" Types: These are products made liquid or semi-liquid by the presence of volatile liquids used to dissolve and/or suspend the adhesive ingredients. These liquids must be largely removed to achieve setting or bonding, and the *final failure* of "solvent" types is mainly tied in with the "solvent." Thus:

{a} *Inability to Lose Solvent* would lead to non-setting and so to final failure. This can be brought about by:

1. *Both surfaces being impervious to diffusion of the solvent:* Here the adhesive would never dry. (See Table

3.) This shows why at least one surface should permit diffusion or be porous. A remedy sometimes used where both surfaces are impervious to the volatile solvent is to *temper* or allow evaporation of the solvents before bringing the sheets together. This is particularly effective where the adhesive develops a high lingering tack and is of a plastic nature. This expedient is often used in handling transparent tissues.

2. The surroundings and the materials to be adhered are already saturated with the vapor of the "solvent" and so cannot remove solvent from the adhesive. The commercial equivalent is the frequently overlooked fact that in an atmosphere fully saturated with moisture (i.e., constantly at 100 per cent relative humidity) cold aqueous adhesives would be largely useless as they would not set and in many cases would penetrate excessively as a consequence into porous surfaces.

{b} *Shrinkage on Drying from Loss of the Volatile Solvent.* This factor is unnoticed where one of the surfaces is pliable and can follow the shrinking glue film. Where the surfaces are rigidly separated, the forces set up by shrinkage often disrupt the glue film and lead to failure of the bond. (This is sometimes incorrectly referred to as "crystallization.")

{c} *Excessive Penetration Due to Excessive Solvent:* As the body of the adhesive may be varied by regulating

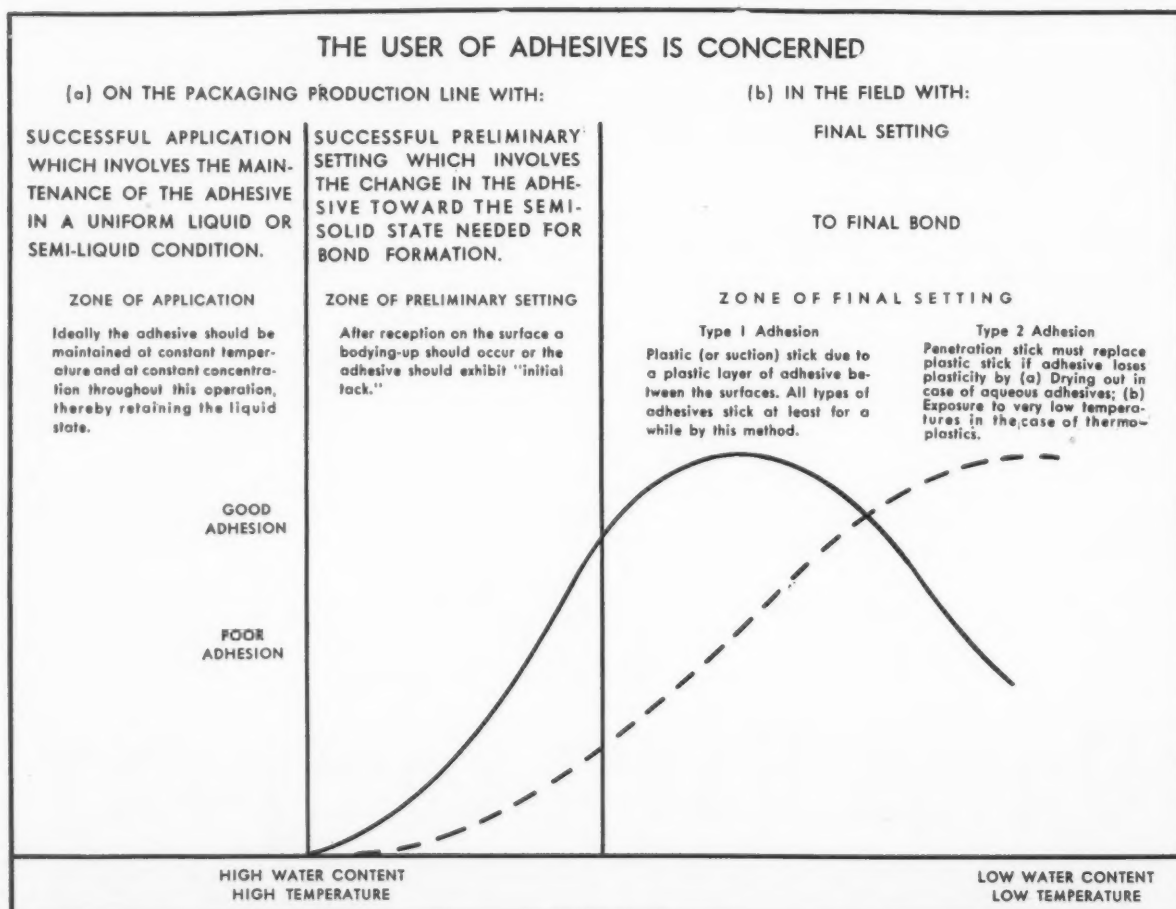
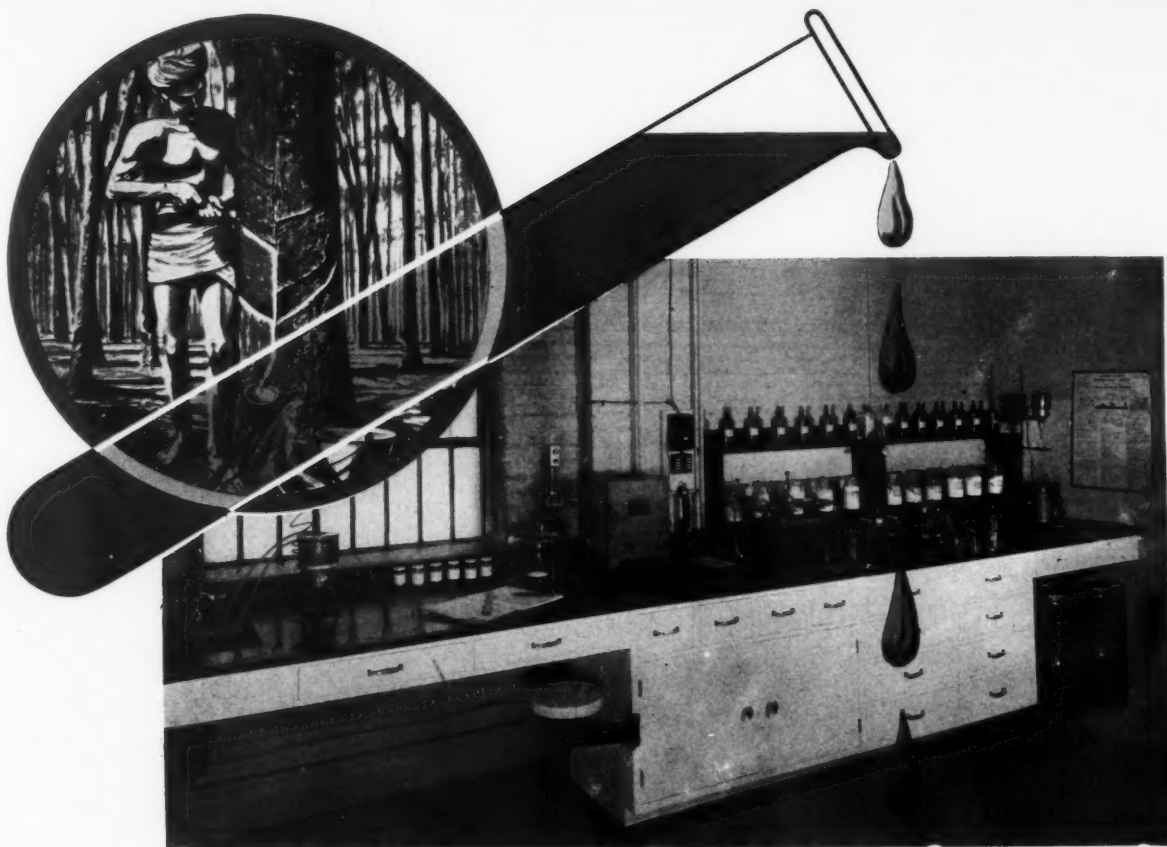


Fig. 2



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TABLE 2.—TYPES OF ADHESION AND SUITABLE ADHESIVES

Type of Adhesion	Surface Requirements	Type of Adhesive	Used on
Penetration Bond	Both surfaces must be absorbent, wettable by adhesive, and permit the diffusion of the solvents	Usually cold aqueous adhesives of solvent type that dry out to brittle films. (Any type that dries to a brittle film would utilize this type of bond)	Porous Materials } Open Paper Stocks
Plastic Bond	At least one surface must permit diffusion of Solvents	Solvent Adhesives that dry out to Plastic Films	Smooth, usually less porous surfaces } e.g., For Aqueous Adhesives—Glassines, Bond Papers For Lacquer Type Adhesives—Transparent Tissues
	Neither surface will permit the diffusion of solvents, i.e., impervious surfaces	Cements, e.g., Thermoplastic Adhesives	Smooth, non-porous surfaces } e.g., Foil to Itself Certain Plastics

A special case for "solvent adhesives" occurs where two surfaces of the same material are soluble in some solvent which can be used to partly dissolve the surfaces and form a solute bond or weld after the solvent has evaporated. This case merely falls in the class of solvent-activation or re-moistening as the solvent is not the adhesive. An analogous case for "cements" is where two surfaces of the same material are thermoplastic and so can be heat-activated and welded together.

the amount of solvent, its dilution should be held within certain limits to avoid excessive penetration between the time of application and the setting or bodying-up of the product to a degree sufficient to stop penetration. The slower setting glues as a class are generally used with heavier bodies to compensate for this. All the factors come into evidence when these adhesives are used on porous surfaces. (See Fig. 3.)

{d} Temperature Limits in Storage and Use Due to Solvent. The adhesive should be stored and used within the proper temperature range where the solvent is liquid.

{e} Solvent Action on the Sheeting, Inks, etc. Often some of the liquid ingredients in the adhesive exert action on the stock, ink, etc., which makes the adhesive unsuitable for the job. Such effects include:

(a) **Blocking:** Here the adhesive solvents partially dissolve and so soften the sheeting as they seep or migrate through it. This partly dissolved sheeting by becoming soft and sticky, tends to adhere to other sheeting packed in close contact.

In aqueous adhesives, e.g., envelope gums, moisture reactivation achieves the same result, i.e., the sticking together of the units called blocking.

(b) **Bleeding:** Here the solvent, which may go through the sheeting either by diffusion or by solution, attacks the inks or colors, causing them to fuzz, run, blot, stain, or show through. This is particularly likely to happen when the solvent is not very volatile and has a strong affinity for the sheeting (as this usually means a rapid rate of diffusion).

(c) **Blisters:** Too active a solvent or swelling action on the sheeting, causes bulging or blisters.

{f} Inadequate Penetration of Non-Plastic Types. If one of the faces does not permit of a penetration bond into or between the fibres, then, where the adhesive dries out to a non-plastic substance, bond failure will occur at this face (see Fig. 2) and the glue film will pull away therefrom while adhering to the other face.

For Cement Types: These are adhesives that change from the liquid to the semi-solid state without loss of

solvents (analogous to solder or Portland cement). The can therefore set on non-porous or vapor-proof surfaces. The final bond may be of the plastic or the penetration type. Thermoplastic adhesives generally give plastic bonds, and failures of this class of bond generally are:

(a) **"Cold Flow" Failure.** While the plastic adhesive should ideally have a yield point greater than any constant tension to which the bond is exposed so as not to flow, in practice the yield point is often below this and so the product behaves as a viscous liquid and exhibits flow. Thus where the final bond is under a continuous tension, failure may occur through this tendency to flow. This effect is more pronounced in warm weather.

(b) **Embrittlement Failure.** The (plastic) adhesive may under certain conditions lose its plasticity and exhibit low tensile bond strength due to the loss of the plastic or suction bond and/or to the embrittlement of the adhesive. Thus thermoplastic cements often exhibit embrittlement at low temperatures and so fail. Whereas in chemical cements, as the products may set to a hard glassy material, a penetration bond must be established (either into or between the fibres of both surfaces) before final setting occurs. Naturally in this case, the tensile strength of the set cement should be sufficiently high to tear fibres.

Manipulative recommendations for the user.

Granted the proper recommendation in terms of the responsibilities of the adhesive by some reputable manufacturer, there still remains the problem of manipulation of the adhesive to assure a good final bond. These factors are divided into three categories, related to: 1. The adhesive itself, 2. The mechanism for the application and 3. The surfaces to be bonded.

Factors concerned with the adhesive are:

1. Temperature of glue: Cold glues should be at room temperature before dilution, as products chilled by ex-

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posure to low temperatures would be unduly heavy and so induce the user to add more water than is necessary.

Heat will thin out most glues, so that the proper working consistency can be attained with reduced dilution in summer; or even with no dilution where the glue pot is heated. In fact, heating the glue pot often provides a simple method of speeding up the setting of the adhesive.

2. Dilution: If adhesives are thinned beyond the limitations outlined by the supplier, the solids in the glue will be carried too deeply into the stock leaving an inadequate film between the surfaces to provide a proper bond. In other words, excessive dilution will destroy the continuity of the film which is essential for adhesion. On the other hand, insufficient dilution may lessen the degree of penetration which is necessary to secure anchorage. Therefore, dilutions should be accurate.

It is, in general, desirable to agitate the adhesive prior to adding the diluent so as to get a true picture of its consistency under operation. Only then should the diluent be added with continued agitation.

3. Care and storage: It is advisable to keep the container covered to avoid any thickening by evaporation, or any contamination by dirt. It is always advisable to store the containers at operating-room temperature. In

winter, apparent heaviness of the adhesives is due to cold; so, before dilution, products should be brought to room temperature. It is also undesirable to store products near radiators as this will cause thinning out and promote evaporation of volatile solvents.

Mechanism of application:

This should permit effective transfer of the adhesive in an adjustable thin film from the glue pot to the surface (or surfaces) being bonded. This involves:

1. Maintenance of consistency: To insure proper mechanical operation and ready transfer of the adhesive, the body or consistency of the adhesive in the glue pot must be kept within a given range. As the glue thickens in the pot through evaporation, it should be thinned, preferably with a special dilute glue mixture. This can be prepared by thoroughly mixing one part of glue with two parts of solvent. For any glue that contains volatile solvents, a cover is desirable to retard thickening through evaporation.

When the body of the adhesive is regulated by temperature, e.g., where glues are applied at temperatures above that of the room, overheating will cause excessive thinning, which results in splashing. Other harmful

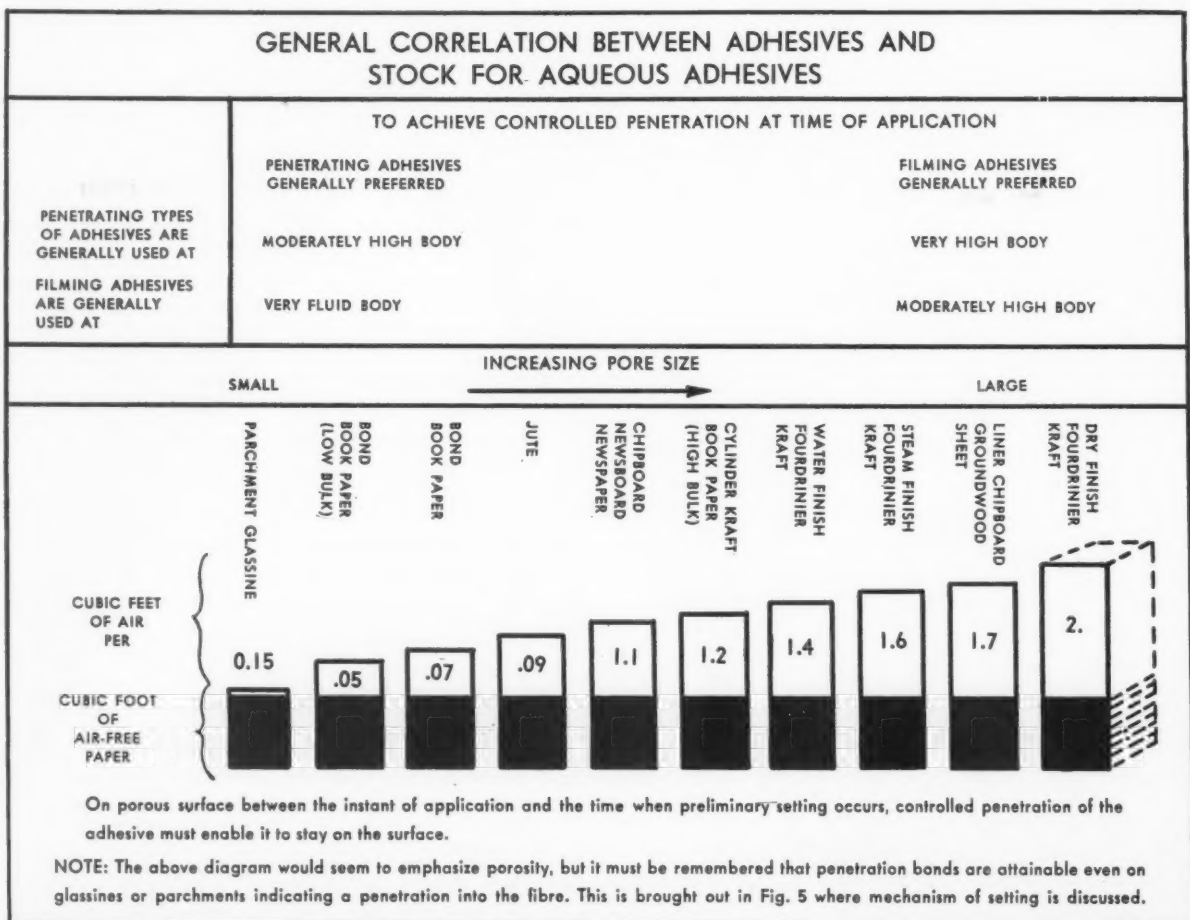


Fig. 3



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Company He Keeps"*

OLD PROVERB

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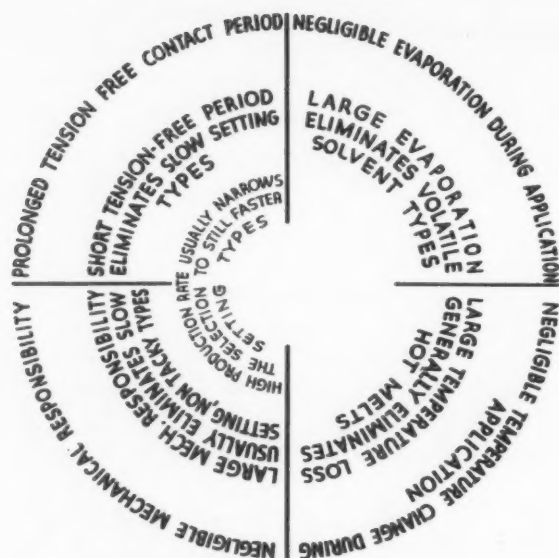
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Adhesives? . . . ARABOL!



HOW EACH SUCCEEDING MACHINE REQUIREMENT NARROWS RANGE OF CHOICE UNTIL CENTER OF RECOMMENDATION IS ARRIVED AT.

Fig. 4

effects are burning and decomposition. Again undue cooling will usually cause a rapid increase in body with consequent soiling of the machine. To hold the temperature of the glue substantially constant, and thereby obviate localized overheating, the glue pot should be jacketed with water or some other liquid which is kept hot by a thermostatically controlled heater.

2. The applicator should have true surfaces to assure uniform transfer to the desired area. This may mean periodic cleaning of the surfaces.

3. The applicator should provide means both for regulating the thickness of the film and for insuring uniform thickness throughout the film. Adjust thickness of film for the regular production rate of the machine.

The surfaces to be glued should:

1. Come into uniform contact with the applicator to effect proper transfer of adhesive. This means that surfaces must be true.

2. Receive a thin, uniform film of adhesive from the applicator.

3. Come into uniform contact with the surfaces to provide a thin, uniform film of adhesive.

4. Be held in a strain-free condition after contact is established (as in 3) by some device, such as a compression belt, until the adhesive has set sufficiently to effect a bond across the surfaces and so permit the handling of the package. When this bond has fully dried or adjusted itself to room conditions, it should be slightly stronger than the materials bonded, to make it fabric-tearing.

5. Generally be at room temperature and adjusted to room conditions. To avoid trouble with cold stock, it is advisable to store it under operating-room conditions.

6. Be of seasoned stock. Damp or green stock (or

even seasoned stock in unduly damp weather) tends to slow up operations. Stock should be supplied from storage properly seasoned.

Meeting field conditions

General Requirements

The adhesive supplier, through long experience, knows that his product must meet field conditions after a satisfactory bond is accomplished under room conditions. These hazards, which include simple aging, exposure to extremes of climate, humidity and moisture, exposure to grease, etc., are discussed below.

Conditions That Develop Flow Failure

The redevelopment of excessive flow will lead to bond failure if the adhesive:

- (1) Slowly yields to any constant tension, or
- (2) Continues to penetrate or migrate into a porous face destroying film continuity by *excessive penetration* across the surfaces. Further, as adhesives are often merely physical mixtures of ingredients, these may not all necessarily migrate at the same rate. This leads to:
- (3) Loss of bonding characteristics, embrittlement, etc., by partial migration of one or more of its ingredients through a relatively non-porous surface at a greater rate than the others. Here the products that remain behind are in themselves unsatisfactory for bonding.

The common climatic conditions that bring about this flow affect many types of aqueous adhesive and include:

High Temperature: Thermoplastic types will often soften unduly as will most other plastic adhesives. Where the bond is under a small but constant tension, the viscous flow of the adhesive ultimately will cause it to yield. The same condition occurs at a decreased rate at room temperature. Examples are:

1) Where a thermoplastic adhesive is used for sealing the springy or resilient flaps of a shipping case or carton, failure will in general occur slowly, especially in hot summer weather.

2) Where glassine is laminated to itself or to board with a thermoplastic adhesive, such as amorphous wax, and then this combined sheeting is adhered face to back with a non-plastic aqueous adhesive, blisters or zones of separation will often slowly form in the wax due to the constant shrinkage-pull exercised as the aqueous adhesive dries out. This effect would be minimized by the use of a plastic aqueous glue or a hot flexible glue. On porous surfaces this may be accompanied by excessive penetration.

High Humidity. As aqueous adhesives (which do not exploit chemical setting) use water as a means of dispersing and/or dissolving some or all of their ingredients, it is at once apparent that water as well as high humidity should exert some effect upon the final bond.

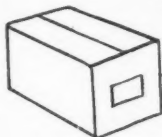
Although aqueous adhesives use water to render them liquid, they often have only a limited affinity for moisture vapor. Thus most case sealing glues once dried will

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War-time changes in packaging methods and materials also require changes in packaging and labeling adhesives. Yesterday's adhesives cannot measure up to today's new-type packaging and shipping requirements. The Paisley laboratories have kept pace with the evolution . . . have been in close touch with every change, every new material, every new need. You can confidently draw upon the great resources of our up-to-the-minute formula files for the correct paste or glue to suit your individual needs. Adhesives to meet specifications of U. S. Armed Forces, Lend-Lease, or of your own plant are quickly devised, if not already in our active files. Many leading firms depend upon us exclusively. So can you. A brief list of the adhesives we supply for various industries, machines and uses are set forth below.



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BOTTLE LABEL GLUES. Non-crystallizing glues supplied for World, Ermold, Oslund, Pony Labelrite, National, semi-automatic and fully automatic machines. Fast drying, non-feathering glues for Straightway labelers, such as Pneumatic Scale, McDonald, Weeks, World, etc. Ice Proof Glues for beer, soft drinks, and beverages subjected to refrigeration and water immersion. Alsop, Grammes, Burt, Potdevin, New Jersey Table Gummer glues for body labels and strip stamps.

CAN LABELING ADHESIVES. Economical Paisley Canner's adhesives operate at speeds above 600 per minute. Convenient Lump Form Hot Pickup Gums for all temperatures, Cold Pickup Gums, Wrinkle-free Lap Pastes for regular or varnished labels. Grip-Tight Label Pastes for spot labeling to tin,terne, black metal, lacquered can surfaces. Tin Machine Glues for Table Gummers and automatic spot labeling of cans.

BAG SEALING GLUES AND PASTES to handle kraft, glassine, moistureproof bags, flour bags, envelopes, packets, etc., on all types of hand and machine sealing operations.

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CASE SEALING GLUES. Regular corrugated and weatherproof fibreboard export shipping case glues for hand or machine sealing through short pressure units. Mileage tests conclusively prove Paisley Case Sealing Glues seal more containers per lb. of glue.

BOX FORMING GLUES. Brightwood Machine Glues, Inman Machine glues, Folding and Set-up Box Manufacturers glues, Laminating, Combining, and Lining machine glues are supplied by Paisley to leading concerns throughout the country.

SPECIAL ADHESIVES. We are prepared to supply latex and rubber cement substitutes, cold water soluble and cook-up pastes and glues, Flexible and liquid animal glues, synthetic resin emulsion cements, waterproof adhesives and many others, all laboratory adjusted to suit every operating requirement.

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remain in the solid state even at 100 per cent relative humidity, when they may in some cases pick up only, say, 10 to 14 per cent moisture. This makes shipments to the tropics possible.

Other aqueous adhesives may have various hygroscopic or moisture-absorbing ingredients added thereto to secure bite, plasticity, etc. These may draw sufficient moisture from fully saturated air to partly or wholly liquefy. Failure will then occur through the three methods listed above.

Type 1. Will usually take place under tension.

Type 2. Shows the general undesirability of using hygroscopic adhesives on porous stocks, because excessive penetration at high humidity is a menace.

Type 3. Here the damp surroundings may cause migration or seepage of the hygroscopic ingredients. This sort of failure is prone to appear on surfaces of low porosity where some of the hygroscopic ingredients, attracted by the moisture in the stock, travel away from or ahead of the adhesive into the sheeting.

This condition is noted in the "discoloration" caused by some envelope gums on bond papers, where the migrating ingredients may cause a color change in the paper due to its acidity, etc. These materials may exert a deleterious effect on the sheeting. Another aspect of this is that the high humidity literally *reactivates* any exposed adhesive.

Low Temperature (at high relative humidity). This case is included for completeness; but here, even though the adhesive will absorb its quota of moisture, the low temperature will usually keep the viscosity of the adhesive sufficiently high to obviate the trouble from excessive

penetration. (Also see temperature embrittlement.)

Actual Wetting. This will actually remoisten the aqueous adhesive and so promote partial or total penetration as described above. A common unsuspected case is the sweating that occurs if moisture is deposited in closed freight cars when their temperature drops off at night; after the interior of the car has previously developed a high R. H. during the hot daytime temperatures due to materials that give off moisture vapor.

Causes of loss of film characteristics

This heading covers a multitude of conditions. It will be noted that failure may be due to surface or stock, as well as to the adhesive. We shall discuss here the more common types of failure.

1) Bond Embrittlement or "Crystallization"

This embrittlement of the bond may be due to physical and/or chemical causes, and both stock and adhesive should be examined for responsibility. Thus:

"Aging" or Migration Failure paralleling the migration of hygroscopic ingredients is commonly found in the bonding of certain transparent tissues where the affinity existing between certain liquid ingredients of the adhesive and the stock can slowly cause their migration. The resulting embrittlement of either the film of glue or the sheeting itself, called "aging failure," is usually a slow process requiring many months. To be quite safe commercially, the estimated life of the package in the field should be well within this period.

Two causes of troubles are: Migration of the plasticizer away from the adhesive into the sheeting. This may result in embrittlement of the glue and so to failure

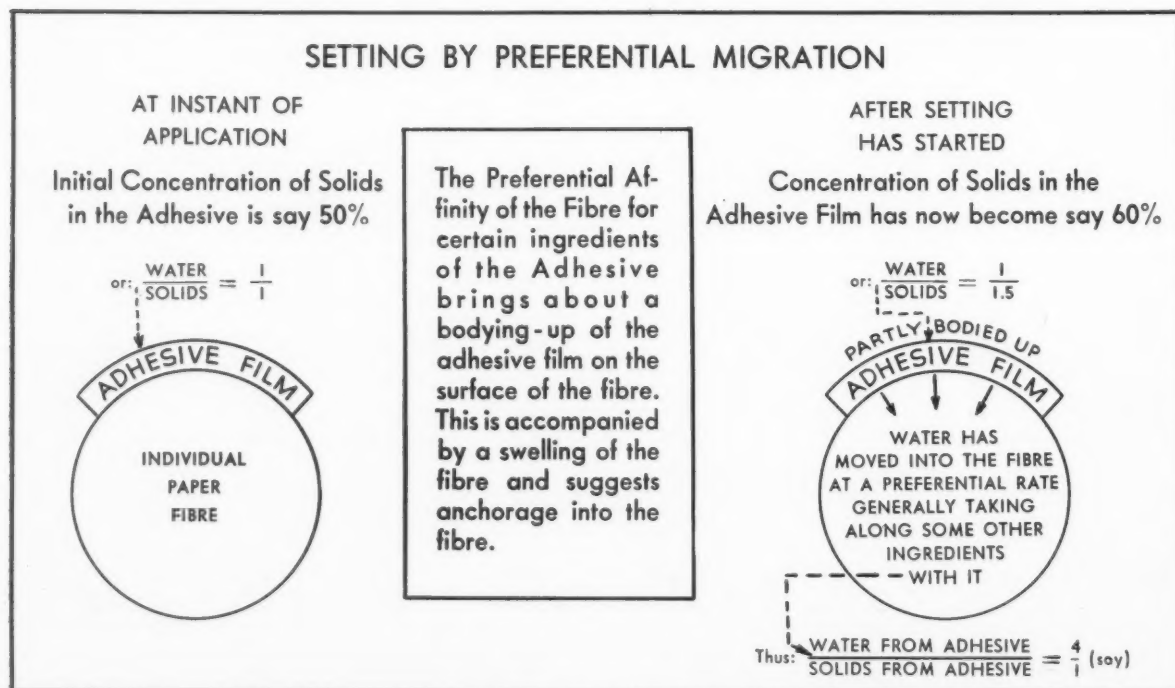


Fig. 5

TIGHTWRAP
GLUE



ICE PROOF
GLUE



COLD PICK-UP
GUM

BOTTLE
LABELING
GUM

FOLDING
BOX
GLUE



ONE GOOD ADHESIVE ON HAND IS WORTH THREE ON THE WAY

Our L #172 Star Adhesive is waterproof,
and for both machine and hand operation.

LAP END
PASTE



CASE SEALING
GLUE



BRIGHTWOOD
GUM

THERE are so many Star adhesives used on All-America winners this year we have not space to list them. Instead, we want to emphasize the complete coverage of adhesive problems that Star gives. For every type of package, for all the packaging industries, there are Star adhesive formulas already tried and proved and ready for purchase. Star adhesives are economical

because they take dilutions up to 50% and actually give perfect adhesion.

It's good sense to specify your adhesive as well as your other package materials. The best cost no more—and the best adhesive is your assurance that design, production, advertising and merchandising expense will be put to a successful purpose.



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Write for humorous, informative booklets: "Here's
a Bird of an Idea" and "Make Your Identity Stick."

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of the plastic adhesive bond. Also migration of the plasticizer away from the sheeting into the glue, resulting in a loss of pliability of the stock. It should be noted that the plasticizer, usually a non-adhesive liquid ingredient, should remain in the adhesive to assure plasticity in the final bond. Ideally the plasticizer should have no effect on the sheeting, but it often has some solvent action.

Temperature Embrittlement: These are a few possibilities:

1. Sometimes only very limited amounts of migration occur in the process of setting, but these ingredients may be of a kind that would cause subsequent embrittlement of the stock or adhesive if the adhesive bond were subjected to heat. A typical case is where hot cement or fertilizer is packed in paper bags.

2. **Loss of Tensile Strength:** This may occur from a variety of causes affecting the adhesive or the stock:

Certain water-insoluble adhesives still may swell on prolonged submersion in water. Thus an adhesive bond

made with this may, on prolonged submersion, lose tensile strength as the adhesive picks up water and swells even though it is still a solid. In other cases the stock itself may lose strength at high humidities and give a deceptive merit to the adhesive.

3. **Rupture Away from the Surfaces:** This class of failure in general is often due to differential expansion, i.e., the adhesive film and the stock expand at different rates under the field conditions and this destroys film continuity across the surfaces.

When the bonded surfaces are immersed in hot wax, bond rupture could well occur through this cause, possibly aided by embrittlement.

When the bonded surfaces are immersed in water, differential expansion under moisture may cause rupture. Thus where two sheets of parchment are adhered with a non-aqueous adhesive—which is also water-insoluble—it may at first appear that this bond would stand pro-

TABLE 3.—SUMMARY OF PROPERTIES AND USES OF ADHESIVES

Property of Surface	Commercial Examples	Type of Adhesive		Requirement of Final Bond	Nature of Adhesive	
(Age-proofing)		Solvent		Cements		
		Aqueous Most generally used	Non-aqueous OK for water-resistant bonds	Thermoplastics Non-aqueous types OK for water-resistant bonds		
Neither Grease-proof nor moisture-proof	Most ordinary papers, kraft papers and paper-board for converting (permit ready diffusion of water and other vapors)				Frequently penetration bond of low tensile strength but stronger than the stock	Generally the several types aq. vegetable glues, silicate Hot aqueous protein glues where high tack necessary
	Wood	Generally used	Usually NG	Chemical cements for water resistance	As above but need higher tensile strength to be stronger than stock	Aq. vegetable glues (occasionally) Aq. Protein Glues (e.g., Fish, Animal, Casein) Types Chemical Cements (e.g., Plywood Resin)
Grease-proof	P. T. Cellophane, Acetate permits the diffusion of moisture - vapors of organic solvents	Frequently used	OK for water-resistant bonds	Thermoplastics also OK where water resistance and no solvent odor desirable	Generally Plastic Bond	Aqueous (Latex and Vegetable) Glues and Lacquer-types adhesives most often used
	Glassine, Grease-proof Paper, Parchment (permit the diffusion of moisture but not the vapors of organic solvents)	Frequently used	NG	Thermoplastics OK	Generally Plastic Bond	Usually slow drying, aqueous vegetable glues
Moisture-proof	M. P. Cellophane, M. P. Acetate lacquered glassine	NG	OK	OK	Plastic Bonds	Usually slow-drying lacquer-type adhesives
	Pliofilm	NG	OK	Material itself is thermoplastic	Plastic Bond	Usually heat-sealed to itself
Moisture-Proof and Organic-Solvent-Vapor-Proof	Many Plastics, Metallic Foils	NG	NG	OK	Plastic Bond	Thermoplastic resin type adhesive

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As you would expect, NATIONAL's expert technicians are in constant consultation with not only Government agencies, but also shipping case manufacturers, and users in many fields. They are thoroughly familiar with all Government adhesive specifications . . . in fact, they helped write many of them. Consult them on your adhesive problems . . . their services are at your complete disposal.

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PACKAGING CATALOG

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longed submersion. In most cases it does not, because the parchment expands on submersion while the glue film does not—resulting in rupture.

The same point is well illustrated where a label is applied to a bottle with a non-aqueous adhesive and is then allowed to dry. On submersion, it generally will come off.

These general examples will illustrate the high spots of field failure. These considerations form an essential part of the decisions of the responsible supplier to whom the consumer should carefully point out the probable field history of the package.

Meeting machine requirements

Uniform liquid condition is necessary for proper application. Further, because the adhesive may need more or less time to achieve the right degree of "preliminary setting" for bond formation, it is helpful to have a prolonged tension-free contact between the freshly bonded surfaces to allow for the setting, making no mechanical demands upon the adhesive until this preliminary setting is accomplished. In the interest of insuring bonding under the most adverse conditions, a longer time for the package under pressure in the sealing machine is very desirable. This does not necessarily mean slower production. It also can be achieved through a longer compression line.

The major considerations desirable for wide versatility in the selection of adhesives are (see Fig. 4):

- 1) Negligible evaporation during application.
- 2) Negligible temperature change in application.
- 3) Negligible mechanical responsibility prior to preliminary setting.
- 4) Prolonged tension free contact period between the freshly bonded surfaces.

The several types of glue applicators fall in three classes: (a) Direct application. (b) Direct transfer. (c) Translatory (or indirect transfer).

This method of viewing an applicator in terms of its major type is of particular value in approaching new projects, as it enables a wide selection in terms of the broad types of adhesives that can be handled by that applicator. In doing this, stress should be placed on the evaporation and temperature-change factors. It should also be noted what measures could be provided partially to reduce mechanical responsibilities as well as to increase the tension-free contact period.

This approach may enable the operator to make the most of his equipment on new developments. Thus for a unit turning out a flat or folded package, e.g., bag, box, etc., if the mechanism can turn out the properly folded flat package and deliver it under a compression belt without having any adhesive whatever in the glue pots, then clearly either a slow or fast glue is suitable—the limitation of the contact factor being overcome by stacking.

Taking the three main types of applicators it will be noted that:

1) Direct applicators can usually be readily protected against evaporation of solvents by a slotted cover; the glue roll partly projecting through the slot. Further, as the sheeting comes into direct contact with the roll that rotates in the glue, if the pot is heated, there is little undue loss of temperature in the applicator. Thus hot glues (hot melts, etc.) are permissible on these units. In general, therefore, this type of mechanism allows a wide choice of adhesives.

2) Simple transfer, in contrast to the direct applicator, permits "spot printing" of the adhesive while the web of paper is in continuous motion.



The importance of good adhesives cannot be over-emphasized today, for the vast bulk of packaging is for military and lend-lease purposes. Under the best of conditions—even disregarding temperature and humidity variations, floating ashore at some isolated island bridgehead—military packages must stand up under severe shipping conditions. These corrugated packages and their adhesives must be able to "take it" without failure. Photo U. S. Army Signal Corps

It will readily be noted that this mechanism ordinarily allows a fair amount of evaporation and if the adhesive in the pot is heated, by the time it reaches the unheated segment of the transfer roll, there is an appreciable drop in temperature. These factors restrict the use of hot melts and of adhesives with very volatile solvents.

3) Translatory (or indirect) transfer provides great scope for evaporation of solvents as well as for cooling the adhesive between a heated glue and the surface receiving the adhesive. Thus, hot glues, and volatile solvent types are usually out of the question.

Further, the adhesive in the applicators, frequently has mechanical duties to perform which in themselves may call for a tacky as well as a fast-setting glue. Thus choice is greatly restricted.

The above perspective is useful in the development stage of packaging so as to obtain the full benefit from the versatility of the applicator. However, in contrast to this, where a given operation is standardized the objective is to select that *specific* adhesive which will yield the most fruitful union with the machine and stock in the form of efficient and foolproof day in and day out production compatible with the field requirements.

To accomplish this, the same pattern for the elimination of types of adhesives is followed—except now—with the other factors standardized; each zone of responsibility is carefully scrutinized so as to discover the particular strategic aspect which must be favored and it is this aspect which will focus the decision.

All of this sounds complicated, but great assistance is generally given by the equipment itself which, when used with the wrong grade of adhesive, is eloquent in a protest that points to the strategic requirements. Further, if the unit has been in operation for a while, the operator becomes keenly aware of those spots that are always demanding attention and where these are linked with adhesives the final formula adjustment of the adhesive has to cater to relieving these barriers to efficiency. Here, too, the reputable adhesive supplier can be very helpful by recognizing these factors promptly and so narrowing his recommendations.

After arriving at a decision on the proper adhesive, the next issue, and the one of great concern to the operator, is how to use it to best advantage. This usually means how to secure the most favorable rate of preliminary setting. Before going into the manipulative procedures to accomplish this, the mechanism of setting should be discussed so that the operator can appreciate the reasons for the subsequent recommendations.

Mechanisms and rate of setting

On the production line, the requisite *extent* of preliminary setting which must occur within the time of tension release (i.e., the time of tension-free contact between the freshly bonded surfaces) provided by the mechanism, determines the rate of preliminary setting required.

Thus where the time of tension release appears inadequate or where the adhesive is not exhibiting a rapid enough rate of preliminary setting, relief may be had:

- (a) By reducing the total tension on the bond (more effective scoring, different grain direction etc.).
- (b) By increasing the area glued off.
- (c) By making provision to increase the "setting rate" of the adhesive (by manipulation of the adhesive, the stock, etc.).
- (d) By providing a longer time of tension release through longer compression, or stacking time.

This again shows how the problems of adhesion are closely inter-related with other aspects of packaging.

The three basic methods by which adhesives change from the liquid to the semi-solid state are:

I. *Increase in the concentration of the solid ingredients.* This increase in the proportion of solids to solvent which causes bodying up is brought about by

(1) *Partial evaporation of the "solvent"* (which usually accompanies "tempering") prior to bringing the surfaces together. As this evaporation of solvent from the freshly gummed off surface is generally slow, it may be promoted by the use of an air current, or heat. This expedient is most frequently used with lacquer and similar slow setting types of adhesives on relatively non-porous surfaces, thus evaporating a large amount of solvent and effecting partial preliminary setting at the time of bonding.

(2) *Solution of a part of the surface itself in the adhesive.* This offers possibilities where the resultant mixture is itself an adhesive. An example is met where lacquer adhesives are used on acetate tissue where solvent action on the acetate helps to body up the adhesive. This is worth consideration in the design of coatings for non-porous surfaces.

(3) *Preferential removal of "solvent" from the adhesive by the stock.* This means that the surface has the ability to absorb or adsorb certain liquid or solvent ingredients either preferentially or faster than other components thereby tending to increase the body of the surface film of adhesive. This process, commonly associated with aqueous adhesives on paper surfaces, follows two main patterns:

(a) "Seepage"—where the volatile liquid is present as a continuous phase—which is usually relatively thin bodied, while the adhesive particles are dispersed therein. Thus when spread onto absorbent paper, the liquid part drains off *into the fibres* and/or through the pores if these are small enough to restrain the passage of the semi-solids.

(b) Preferential migration of certain liquid ingredients—which occurs in the fibres of paper. Thus consider an individual fibre. (See Fig. 5.) Shortly after the adhesive is applied an increase in its concentration occurs resulting in an increase in viscosity or body, and frequently in an approach to the plastic or semi-solid state.

II—Change of temperature:

(1) May increase or decrease the body of the adhesive. However, most glues thin out on heating. Thermoplastics exploit this mechanism practically exclusively though it may be used in conjunction with many cold aqueous adhesives.

(2) May accelerate or retard some auxiliary physical change, e.g., evaporation of a volatile "solvent" leading to bodying-up.

(3) May bring about or accelerate a chemical change that does not occur at room temperature and so body-up the adhesive.

III—Chemical change may body-up adhesive through:

1) Interaction between the ingredients and the adhesive. This may be accelerated by temperature.

2) Interaction between the ingredients in the adhesive that are catalyzed by the surroundings.

3) Interaction between the adhesive and its surroundings: often caused by ingredients in the adhesive.

The compromise called Commercial Success

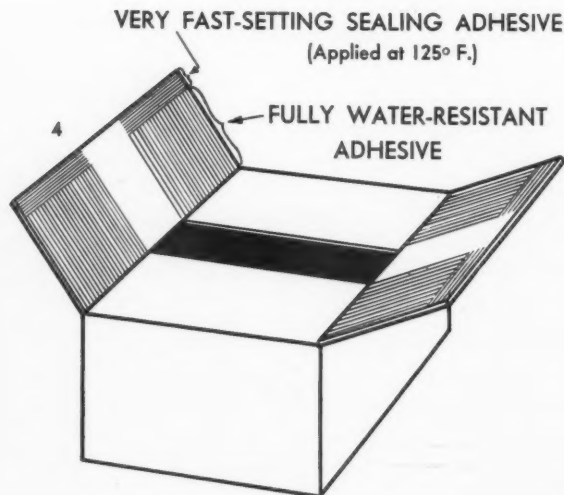
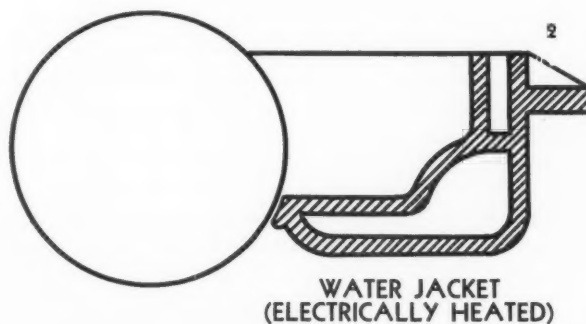
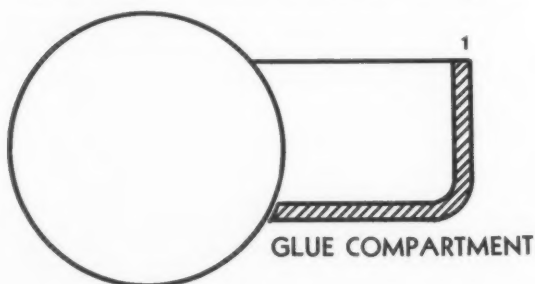
The foregoing discussion brings out clearly that the achievement of successful adhesion always involves a number of factors, prominent among which are the nature of the surface, the field requirements and the machine factors. This all vindicates the policy of the progressive consumer of obtaining team work between machine designer, fabricator of material and adhesive supplier.

Further, as it often is the duty of the adhesive to perform more or less mechanical responsibilities while still yielding clean, efficient production at the maximum rate, these factors in themselves have to be balanced against each other in the process of formulation of the adhesive—placing stress on the major demands of the situation and compromising on other details.

This concept of a "balanced formula" is really the final focus of decision to yield optimum commercial results on the equipment. Ample evidence of this is found in the large number of adhesives of each type made by responsible manufacturers—each "balanced" around a given operation.

Future progress will emphasize what has been true in the past, i.e., that with better understanding of an entire problem there always comes not only that increase co-operation—but also the compromise—that spells success in modern packaging.

Sealing of packages may require two different types of adhesives: one to form a quick-setting bond to hold the flaps temporarily, the other to form a permanent seal. Equipment for the purpose is available. Fig. 1 shows the standard cold glue pot for case sealing machines. Fig. 2 is a diagram of the hot water-jacketed glue pot for applying heated adhesive. Photo (3) shows specially divided glue pot for application of two different glues and the drawing (4) illustrates the automatic application of two different type glues. Photo Standard-Knapp Corp.



WRAPPINGS, COATINGS, LAMINATIONS

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Transparent Films

by C. A. Southwick, Jr.

THE uses and production of transparent sheetings were rapidly expanding in the years before war curtailments. Not only was this development reaching new highs in the volume of production, but also in the number of forms and types of older materials and in the number of generically new sheetings.

The first cellulose sheetings were non-moistureproof and had variable physical properties. By 1942 cellulose sheetings were being made with a wide range of moistureproofness and in many modifications for specific uses or product needs. Unfortunately, wartime restrictions on critical chemicals and equipment have reduced the number of types of cellulose films, stopped or limited the production of other kinds of films and, of course, prevented the introduction of new ones. Civilian uses of all transparent materials have been defined, limited or even forbidden, depending on the product, the end use or the film.

War demands are taking increasing quantities of films for jobs requiring special properties and functions. As these war uses expand, it is obvious that the amount of sheeting available for consumer uses will be reduced to only the most essential needs.

In such cases transparent films are now being used because they meet functional needs and not because they happen to possess clarity and decorative appeal.

Regenerated cellulose films

This type of material makes up the bulk of the transparent films in production today. This film is transparent, colorless, slow burning and affected by changes of the

humidity in the atmosphere. The fact that this base is hygroscopic, or water-wettable, makes it possible to use this film for products having high fat content but it also results in a film having no moistureproofness. The most widely used form of regenerated cellulose sheeting is that with a coating of moistureproof lacquer. The moisture-proof type film is used in quantities greatly in excess of the uncoated film. Because of the fact that the function of the resulting film is a property of the lacquer coating, it is possible by varying the lacquer composition to produce films having high or low moistureproofness and with or without heat-sealing properties. However, if the film is to be used in contact with free water, it is usually necessary to use a so-called anchored type coating which is especially made to give better adhesion of the lacquer to the cellulose base. Many of the modifications of cellulose films depended upon changes in the degree of plasticization to meet the needs of a particular product, or package machinery.

As a result of the demand for increased moistureproofness and greater toughness and strength, there has been a large increase in the volume of cellulose films which have been laminated to each other or to other materials, such as paper, metal foils, etc. The addition of a suitable laminating agent markedly can improve the physical properties, and the resulting film has found many applications for war uses. Such films are being used for large size units of dehydrated foods, for field ration units and to obtain resistance against war gases.

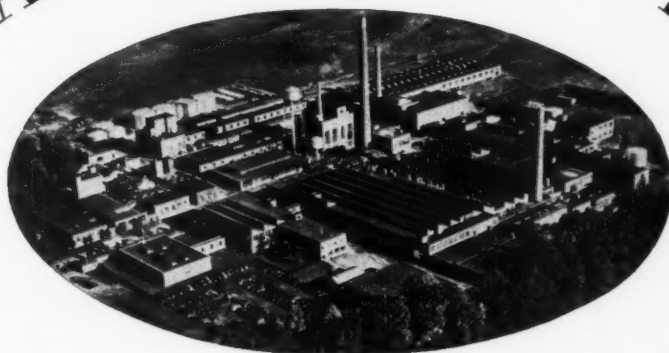
Cellulose acetate

Cellulose acetate had been finding increasing uses in our peacetime economy because of its dimensional stability under varying atmospheric conditions. It also possesses other physical properties which made it suitable for use in rigid transparent containers. Cellulose acetate films differ radically from regenerated cellulose because the acetate base is water-insensitive and can only be put in solution by certain solvents. Its manufacture is more involved and since its base material is usually cotton linters rather than wood pulp, it is higher in cost than regenerated cellulose. The acetate film is unusually brilliant and clear but possesses no useful degree of moistureproofness. Because of the effect of some organic solvents on the film and the poor adhesion of lacquer coatings it is not usually lacquered although the result would be a film of excellent moistureproofness. Cellulose acetate film is very stable to dimensional changes with varying atmospheric humidities and as a result has found wide use as windows in cartons, bags, etc., and as a surface layer when laminated over decorative and printed papers and fibreboards. Cellulose acetate has good stability against outdoor exposure and found some use when laminated to cotton scrims as a glass substitute. It is now finding war

Laminated cellophane bag within carton keeps frozen meats and eggs in prime condition.



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WHILE emergency restrictions and government demands are in effect there must be the utmost conservation of materials in civilian and industrial use. To-day, under the most exacting conditions, SYLVANIA cellophane is proving its value in new uses and in replacing shortages of other types of packaging materials.

Following are some of the features of SYLVANIA cellophane which recommend it for packaging requirements. It meets rigid specifications for

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Transparency	Economy	Lack of taste
Air proofness	Flexibility	Non-corrosive properties
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uses as a laminated material in connection with various cloth and paper combinations to produce stable moisture-proof wrappers and liners for export shipments.

Ethyl cellulose

This film had just begun to find applications and uses before war restrictions and curtailments removed it from the civilian market. Ethyl cellulose is extremely stable to alkalis, heat and light and is extremely clear and inherently flexible. Its moistureproofness is about the same order as the cellulose acetate film. Ethyl cellulose sheetings can be made moistureproof by the addition of suitable lacquers as surface coatings. Although the base material is stable when melted, the film is extremely difficult to heat-seal except under special conditions.

Rubber hydrochloride film

Rubber hydrochloride film differs materially from the films previously described in several important ways.

First, its base is rubber and not cellulose; second, it is inherently moistureproof and capable of strong heat-seals without added coatings. Processes of manufacturing consist of adding hydrogen chloride gas to a special grade of crude rubber. The resulting resin is dissolved in solvents and cast on a moving web which is passed through a heating chamber to evaporate the solvents and leave a transparent film. Rubber hydrochloride sheets are extremely tough and can be stretched to a higher degree than any of the cellulose base films. In heavier gauges, the film is slightly cloudy. The stability of rubber films is poorer than cellulose films especially when exposed to heat and to direct sunlight. Since this film has the property of making strong welded seals, it offers possibilities for the packaging of certain liquids which could not be handled by any other film. Because of the rubber shortage, there are no civilian uses allowed for this material. There is, however, some film being manufactured and laminated for the packaging of aircraft engines by Method II (use of desiccant).

Glassine as a Protective Wrap

by F. S. Leinbach

THE new general Conservation Order M-286 on specialty papers applies to plain, wax-coated and laminated glassines as well as other specialty papers. Because this group of papers has always been used very largely for protective rather than decorative purposes, the new restrictions prohibiting use for non-essential products do not materially alter the situation regarding their availability. Their essential protective qualities are borne out by the fact that possibly 80 per cent of the various glassines have been used in the food field.

Glassine is the densest, most compact form of paper. It is made of exceedingly small fibres that are "hydrated;" that is, water is driven into their cellular structure until they have become nearly gelatinous. After the paper is formed on the machine, it is supercalendered. Under the terrific pressure and heat on the hydrated cellulose, the paper becomes smooth and quite transparent. It is then *glassine*. If the supercalendering is omitted, the paper is neither smooth nor transparent, but the other inherent qualities are there. This is termed *greaseproof paper*.

Because water and grease are mutually repellent, the water in the fibres of glassine and greaseproof papers makes them highly resistant to oils, fats, and greases. The degree of resistance is usually measured by the number of seconds a paper can withstand penetration by turpentine, the first spot of failure ending the test; 1,800 seconds is considered adequate for general use.

The close-knit structure and the hydrated condition

of the cellulose in these papers prevent transmission of flavors and aromas. Thus, they maintain inherent flavor and aroma within a package and exclude any that might be contaminating. They are also gasproof, particularly to hydrocarbon vapors. Untreated, however, they are neither water-proof nor moisture-vaporproof. These qualities, particularly the latter, must be attained by a surface treatment with paraffin wax, or a mixture containing some percentage of that material.

The smooth, non-porous, non-absorbent surface of glassine is ideal for wax-coating, lacquering or laminat-

Glassine laminated to lead foil forms inner protective wrap for tobacco. In combination with other sheeting material this resists moisture and grease. Photo Riegel Paper Corp.





Patriotic Papers

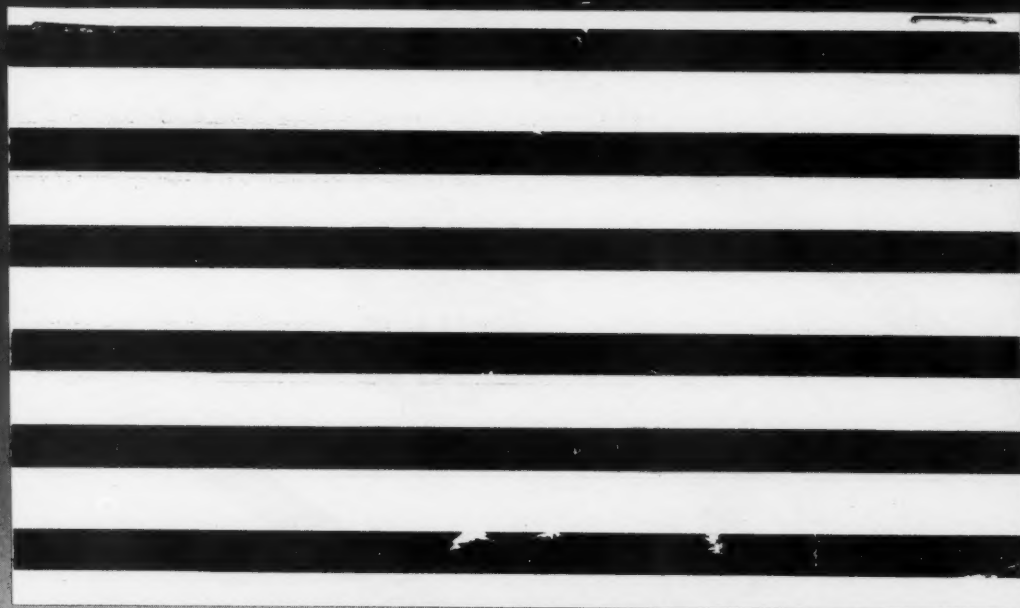


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Inner bags of glassine, in some cases laminated to other sheetings, afford protection to hygroscopic dessert powders, as the two on the left. Right: Cake mixes and special flours frequently contain shortening which greaseproof glassine protects from rancidity and infestation. Photo Riegel Paper Corp.

ing and most of the glassine manufactured receives one of these treatments. It is waxed to make it moisture-vaporproof, more transparent and glossy and to assure adequate heat-sealing. It is laminated to produce a paper that is softer, more transparent, and stronger than a single sheet of the same weight. The laminating agent usually is formulated to make the sheet also moisture-vaporproof. Glassine is lacquered to make it more transparent and glossy, repellent to moisture-vapor and water and to assure its making a good heat-seal. The coating also enhances the original greaseproof, gasproof and flavor-retaining properties.

Glassines may be embossed for decorative purposes. The recent discovery of "deadness," or the ability of a soft glassine to hold folds, has brought out many new applications of embossing. All glassines and glassine derivatives can be printed by any of several methods, thus extending their usefulness in identification, sales appeal, and machine operation through spotting by electric eye.

In glassine the weight of 500 sheets, 24×36 in., is taken as "basis weight." Thus, "25# Paper" means that twenty-five pounds of paper will cover the area of this much paper, 432,000 sq. in. In single sheets a ream of paper weighs from 20 to 40 lbs.; laminated glassines may weigh from 45 to 90 lbs. The weight of a thousand sheets in any given size needed for a package is calculated by the following formula:

$$\frac{\text{Length} \times \text{Width} \times \text{Basis Weight}}{432}$$

Length and width are in inches and basis weight is in pounds. The figure obtained here multiplied by the price of a pound shows the cost of a thousand packages.

There are many variations of glassine and its derivatives: for strength and economy the unbleached or

lightly bleached amber types are used. There are also the opaque, pigmented whites, and the clear and colored transparencies. Each mill has standard colors which it either stocks or runs from time to time so that smaller lots will be available. Ordinarily the massive proportions of a paper machine require that special colors and grades be made in fairly large minimum quantities—usually five tons.

The properties of these papers read like the language of packaging—impermeable, greaseproof, moistureproof, gasproof, flavor-and-aroma-retentive, mechanical operability, transparent, heat-seal, economy, etc. These are qualities so fundamental that each year glassine finds new uses. Recently products that might have suffered from the shortage of materials have found the protection they need in glassine and its derivatives. The sales of these packages vouch for their appearance as well as their protective value.

For food products containing oil, such as the shortening in crackers or biscuits, papers can be used in several ways. In one system a sheet of greaseproof paper—or for better protection, waxed glassine—is interfolded by machinery as it sets up the carton. For further protection the carton is wrapped with a moistureproof material.

Many such packages are made by equipment that sets up the carton and the liner independently, so that the side folds of the liner are heat-sealed for positive closure. After the package is filled, this type of liner may be closed by either the patented heat-seal closure, or the very efficient double fold closure developed by several machine companies. Unless the product needs unusual protection, a package of this type generally does not carry an outer wrap, for waxed glassines are the most moisture-vaporproof form of waxed paper. Glassine is

advisable in these packages not only because it maintains the original quality of the product, but also because it allows the use of a less carefully made stock, and printing inks which might contaminate the product through another type of liner. The liner also prevents the grease of the product from staining and spoiling the appearance of the carton and helps to minimize rancidity.

The same general type has found wide acceptance in packaging cereals, brown sugar, and other products where moisture-vaporproofness and protection of flavor and aroma are of paramount importance. The waxed liner allows reclosure of the package to protect the unused portion of the contents. Greaseproof paper and glassine are often laminated to paper board to produce greaseproof carton stock of good moistureproofness.

If the product is such that contact with wax is not desirable, a liner can be made from laminated glassine. One type of machine places the liner directly from rolls of paper and closes it with glued seams. Another inserts prefabricated bags as the carton liner. These bags can be obtained with an imprint at the top, allowing for a heat-seal closure. Several soup mixtures and dessert powders are packaged in one of these types.

For some products, among them certain pre-cooked cereals and dough mixtures, which need not be moisture-vaporproof, a plain, unwaxed glassine liner is used, with a folded closure and glued seams.

Untreated glassines are not alkali-proof, but waxed glassines are to some degree, and lacquered glassines are excellent. While no established soap manufacturers allow free alkali in their product, the lubricants used in molding the soap have an alkaline effect on the wrapper if traces of them are carried on the soap. Therefore, the soap manufacturer finds in glassine derivatives a wrapper combining protection for moisture and perfume, and long lasting appearance.

Surgical products, such as bandages and items for first aid, are hermetically sealed in glassine and then sterilized by heating at high temperature. The dense structure of this wrapper keeps the objects sterile longer.

Many types of machines are available for wrapping small items, particularly cakes, in waxed glassine, printed or plain. Spotting by electric eye is common, and the closures are heat-sealed. The same machines handle lacquered glassines well. If printing or spotting is not desired, these machines will affix a label to this type of wrapper with a special glue. Small pies and similar products that must "breathe" are wrapped in unwaxed or uncoated glassine, often prefabricated into different types of attractively printed bags.

A striking example of the industry's ability to "tailor-make" papers for specific uses is found in the economical printed and lacquered glassines widely used for packaging bread. Specifically developed to combine strength, good mechanical operating qualities, and excellent protection (flavor as well as moisture) with transparency, gloss, and brilliant coloring, these papers offer an opportunity for good individual designs.

Glassine as a wrapper, a liner, a covering for carton stocks, and often as an interleaf between layers, is of

prime interest in packaging candy. Its greaseproof and flavor-retaining qualities preserve the package as well as the product.

New and interesting products are found in combinations of glassine. One manufacturer finds excellent long-term protection in packages to be shipped to distant points when he wraps them with a waxed, laminated glassine. This combination offers unusual moisture-proofness, with all of the inherent qualities of waxed glassine. Lacquered laminated glassines are virtually unsurpassed for moistureproofness. Although they are sensitive to handling, several types of equipment can handle them well, and the protection they offer well rewards the care required. Machines are available which will use rolls of heat-sealing lacquered glassines automatically to produce heat-sealed bags.

Bags, often attractively printed, are obtainable in any of the grease-proofs, glassines and glassine derivatives. Because of this wealth of available combinations with glassines, the bag maker should always be consulted on packaging problems.

The versatility of protective glassine is shown by manufacturers who use various forms of it to replace metallic foil on candy, chewing gum, or small packages requiring superior protection, and on wrapping machinery that had been designed to take advantage of the folding characteristics of foil.

These and many other examples show that when working out a new package, wherever a problem of protection arises that may involve oils and greases, flavors and aromas, loss or gain of moisture, or contamination by vapor or bacteria after packaging, where mechanical operability is a factor, or transparency, heat-seal, or attractive printing are an advantage, full consideration should be given to glassine and its derivatives, and the long experience of their manufacturers in the solving of packaging problems.

SUMMARY: PROPERTIES OF GLASSINE

DENSITY—Functional

- 1) Greaseproof
- 2) Flavor-proof
- 3) Low permeability

DENSITY—Decorative

- 1) Glossy
- 2) Smooth
- 3) Impermeable

These characteristics permit the following:

- 1) Waxing, one or two sides
- 2) Lacquering, one or two sides
- 3) Laminating, to same or other media

Good printing by:

- 1) Letter Press
- 2) Aniline
- 3) Gravure

All of these develop the following in a package:

- 1) High transparency
- 2) Good opacity
- 3) Thermoplastic (heat-) sealing
- 4) Extremely low permeability to:
 - a) Moisture
 - b) Oxygen
 - c) Carbon dioxide



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Waxed Paper

by Hugh C. Pierson

IN wartime the old saying that "no business can escape change" is especially true, and applies to the waxed paper industry as it does to any other. The breach left in the packaging field by the restriction or removal from the civilian market of certain packaging materials, has been adequately filled by different grades of waxed paper and other protective materials. As a case in point, the gum manufacturers found that waxed or wax-laminated paper gave their product the necessary protection when foil had to be replaced.

It is easy to understand why waxed papers so readily fit into most packaging problems, where moisture protection is necessary, when several factors are considered. First are the properties of wax that are inherent in the product. Wax itself is odorless, tasteless and not affected at ordinary temperatures by either acids or alkalies. It is not a host to either mold or yeast spores. The proper grades withstand a wide range of temperature without loss of protective powers. When a sufficient surface coating of wax is applied to the right kind of paper, it is easily and completely sealed by the application of heat, no glue being necessary. The grades of paper that may be waxed are many: tissues, twisting paper of several grades, regular and opaque sulphites, glassines, grease-proof krafts and manilas. Papers may be made opaque or highly transparent depending on the methods of waxing and the raw stocks used.

Flexibility of wax paper

The equipment of a modern waxed paper company is very flexible in the kinds and weights of waxed papers that may be produced. The same raw stock may be waxed in a variety of ways, either lightly or heavily. A sheet may be waxed on one side only, impregnated with wax with little, if any, surface wax, or waxed lightly or heavily on both sides of the sheet with or without much penetration of the sheet as is desired. Package wraps are made to fold readily around a carton. When printed in several colors, beautiful effects are obtained, and the proper wax coating over the printing gives a fine glossy appearance.

Its adaptability and economy account in large part for the ever-increasing amounts and kinds of waxed paper now in regular use.

The laboratories maintained by waxed paper manufacturers, ink makers, paraffin and resin manufacturers, working separately and often in conjunction with each other, have developed many "tailor made" papers to solve some particular problem. By working, also, with the manufacturers of wrapping and carton lining equipment, it has been easy to develop the right paper and the right wrapping or lining machine for almost any kind of package. Waxed papers are widely used, and some of the more common uses are here noted:

Bread wraps: Waxed bread wrappers are of three general kinds. The one ordinarily used is the opaque wrapper printed in bright colors. The latest development in the use of this type of wrapper is "electric eye" registration. With this device attached to the wrapping machine, a top and two side panels may be registered the same on all loaves. If the eye is not used on automatic wrapping machines, the printing must be of a continuous nature so that it need not be registered on the loaf. Some bakers have also added equipment for applying an identifying end seal on both ends of a loaf to provide additional identification should the bread be stacked in racks with only the ends of the loaves showing.

Transparent waxed wrappers are also widely used, especially on special breads such as rye, whole wheat, raisin, etc., adding to sales appeal. Transparent sulphite and glassines are both used, and are popular not only as a bread wrapper but also for packaging sweet goods, cakes and rolls.

Blank cartons with printed wraps and liners: The waxed paper industry has come a long way since cartons were first wrapped in waxed paper. They are wrapped to protect the contents against moisture loss or gain. Originally, an ordinary waxed sulphite was used which partially obscured the printing on the carton. A more transparent wrap was developed and then a super-calendered sheet of high gloss and transparency followed. This was, and still is, an excellent wrap for a printed carton, combining reasonable cost with a high

Packages for emergency rations and lend-lease supplies use protective wraps of waxed paper. Photo Central Waxed Paper Co.



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degree of transparency and protection, and is readily usable on any self-sealing wrapping machine. Considerable tonnage is used by manufacturers of foodstuffs, one of the larger users being the biscuit trade.

Printed wrappers on glossy opaque stock were the next logical step, followed closely by the wrapper with electric eye registration. Fine process printed wraps of two, three and four colors are now common, and the panels may be registered as to printing with respect to the carton so the appearance is that of a printed carton. This makes a most convenient and economical method of producing a moisture-proof package, especially if a large variety of brands are manufactured. Much less money is tied up in inventories with printed waxed paper than is necessary if dozens of different printed cartons had to be held in stock; and at the same time less storage space is needed. Plain cartons may be used with any number of different printed wraps and only a few minutes required to take one printed roll off the machine and replace it with another for a new special brand, provided, of course, the size of the cartons are the same.

There have been considerable standardizations of carton sizes in the last few years so that the number of sizes of cartons, compared to the number of brands and designs used, is small. It is not unusual to see a foodstuff manufacturer with only three or four carton sizes producing a hundred or more brands, many under special label, and the balance their own line. In cases like this, it is an advantage to carry plain cartons and printed waxed paper.

Biscuits, gum, soap, salt, butter, candy, yeast and dehydrated eggs are but a few of the products adequately protected by waxed wrappers properly registered by means of the electric eye.

Carton liners: The plain chipboard of the carton is protected from the contents by the use of waxed glassines, krafts or sulphites, placed in sheets or in die cut form by hand, or automatically cut from rolls and inserted by the carton forming machine. When the product to be cartoned has a grease or shortening content, the waxed liner most commonly used is a waxed glassine. The reason for this is that a glassine paper is greaseproof and prevents the absorption by the chipboard of the shortening which would cause unsightly penetration. Some packagers prefer the use of waxed bag liners and these are also manufactured by a few of the waxed paper manufacturers.

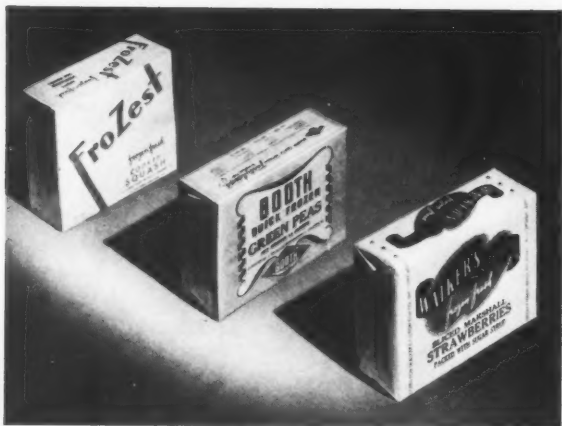
Government use: There is no better proof of the ability of a proper wax coating to protect foodstuffs from atmospheric changes than its use by the Quartermaster Corps which specifies heavily waxed wrappers, or wax-dipped cartons for packaging U. S. Field Ration "K" in breakfast, dinner and supper packages. These packages may be subjected to the worst possible climatic conditions—in the steaming jungles of the South Pacific, the baking heat of North Africa, or the sub-zero cold of Arctic regions. Yet these concentrated food rations reach the men in good condition, thanks to a great extent to the protection of wax. The climatic conditions, the irregularity of storage and transit facilities, to which these rations are subjected, far surpass any to be found in



1. Printed waxed paper in rolls protectively wraps dry cereals. 2. Flavor freshness and usable condition retained by wax wrap for wide variety of products. Photo Central Waxed Paper Co.

normal use. Dried eggs, protected by a wax wrapper, are shipped in huge quantities under lend-lease agreement.

Butter: Some creameries have changed the type of waxed paper used on their automatic butter-wrapping machines. These machines first wrap the butter in parchment which can be stripped off easily without butter clinging to it. Many creameries then add a dry wax wrapper, which gives partial protection against loss of weight through evaporation. Surface-coated waxed sheets, though they contain no more wax than the im-



1. Frozen foods are protected and identified by printed waxed paper. 2. Baked goods and chewing gum remain crisp, fresh and flavorful in waxed paper. Photo Nashua Gummed & Coated Paper Co.

pregnated or dry sheets, are considerably more resistant to moisture. For this reason, several of the larger creameries which formerly used dry waxed paper now use a sheet with a surface coating thereby considerably increasing the protection offered.

Chewing gum: Much of the stick gum, formerly individually wrapped in laminated foil, is now wrapped in specially made waxed papers, thus releasing large quantities of aluminum and other metals which are needed for direct use in war industries.

These examples adequately demonstrate not only that waxed paper stands on its own feet as a packaging material, but also that through complete cooperation among refiners and manufacturers of both waxed paper and machines, it is readily adaptable to an even greater diversity of practical uses.

Frozen foods: The paper used for wrapping frozen foods is specially waxed. The regular wax coating is fortified by the addition of certain other waxes or other substances to insure a seal and flexibility that will withstand the extremely low quick-freezing temperatures to which these packages are subjected. The wrapping equipment in many of the frozen food plants is equipped

with the electric eye. With the restrictions on the use of tin cans for packing foods, the production of frozen foods will no doubt increase at an accelerated rate, and the waxed paper used will increase proportionately.

Meats: At ordinary cold storage temperatures, a straight wax coating does everything asked of it. Several years ago waxed liners began to replace parchment in poultry cases because they offered better protection against oxidation and "freezer burn."

For many years the meat-packing industry has used large amounts of waxed paper. The advent of the cold storage locker service marked the beginning of one of the most rapidly mushrooming businesses in the country. Fresh-killed and cut meats can be kept satisfactorily for many months at below-freezing temperatures, thanks to the development of specially made waxed papers. A satisfactory locker paper must be strong, wet or dry, bloodproof, and able to withstand extremely low temperatures. It must also be moisture-proof yet dry on one side so that the butcher may stamp the date and kind of meat on it. All of these qualities are available today in many waxed papers.

Candy: While the candy trade has for years been using various grades of waxed papers, in recent years the manufacturers of candy bars especially have turned more and more to waxed transparent glassines, opaque glassines, and opaque sulphites, some coated with a combination of high-melting-point waxes. This trend has increased in the past year as the use of other types of wrappers has been restricted. In addition to satisfactorily replacing foil with an attractive printed wrapper, the savings in cost of the wrapper help to make up for the increased cost of the other materials and the labor that goes into the manufacturing of the candy bar itself.

For a great many years waxed paper has been used as a wrapper for candy kisses, where a sheet with special twisting qualities is required. Twisting qualities may be imparted to sheets of other materials by the addition of controlled amounts of a plasticizer. Through recent developments in this art, transparent waxed glassines are now used quite generally as twist wrappings for candy.

Special Bags: Aside from bags used as carton liners and for bread wrappings, bags are made of waxed or wax-laminated paper for a variety of other products. Potato chips and popcorn are often packaged in this way, while envelopes of laminated glassine or sulphite are used extensively for packing flavoring powders.

Research is continuous: The waxed paper industry will be equal to the demands put upon it in these trying times, as has all business in this country. Laboratory research will continue at an activated pace, to be ready with better products for new as well as old uses. If war has no other benefit, it stirs all industry to find better, cheaper, easier ways to protect the necessities as well as the luxuries of life. Sometimes we are wont to think of any radical change, for example the use of an entirely new type of package or wrapper, as a "substitution," but the use of this word in that connection is often ill advised, for the "substitution" may turn out in reality to be an "improvement" which will be permanent.

Research

FOR PACKAGING PAPERS

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Manufacturers of packaged products, who need to find new packaging materials, are invited to discuss the application of Warren research to their problems.

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Papers for Special Packaging Requirements
Papers for the Converting Industry

Vegetable Parchments

by Glenn Stewart

VEGETABLE parchment is a processed paper made from unsized sheets prepared from rag or pure chemical wood pulp. The original raw stock, which the paper maker calls *waterleaf*, is passed through a bath of sulphuric acid. The acid is washed off the paper with pure water and the paper is then dried by passing it over steam-filled rolls. The sulphuric acid dissolves the outer surfaces of the paper fibres into a sort of jelly, thus forming what the chemist would call an *amyloid*. When the action of the acid is stopped by the rinsing process, the interstices or holes of the paper are filled with this jelly. The paper has thus been changed from a sheet that was formerly instantly soluble in water into one that will not go to pieces in water.

When this treatment was discovered, about the middle of the last century, the originators were hard pressed for a name for this astonishing new paper. It looked so much like animal parchment, especially when wet, that they gave it the name "parchment," at that time and, since all paper was being made from rag stock of vegetable origin, they prefixed the word *vegetable*. Today the paper is usually called "*genuine vegetable parchment*" to distinguish it from imitation papers that look like it, but do not have quite the same properties as the original article.

Adaptability to various conditions

The quickest and best way to test vegetable parchment is to soak it in water. It immediately becomes so soft and pliant as to appear even stronger wet than dry; but, whether the water is cold or boiling, it will not destroy the sheet or cause it to go to pieces. Vegetable parchment is likewise grease-proof or grease-resistant. Fats

and oils, whether hot or cold, have no more effect on it than water, and some grades of parchment will permit no penetration whatever. These two inherent qualities—insolubility and grease-proofness—plus the fact that it is odorless and tasteless, account for the major uses of the paper in industries with problems of protection from moisture and grease.

The natural color of genuine vegetable parchment is white, but it is also available in colors. There is no problem of free fibre, lint, or fuzz with genuine parchment; consequently, parchment strips clean from any moist or sticky surface.

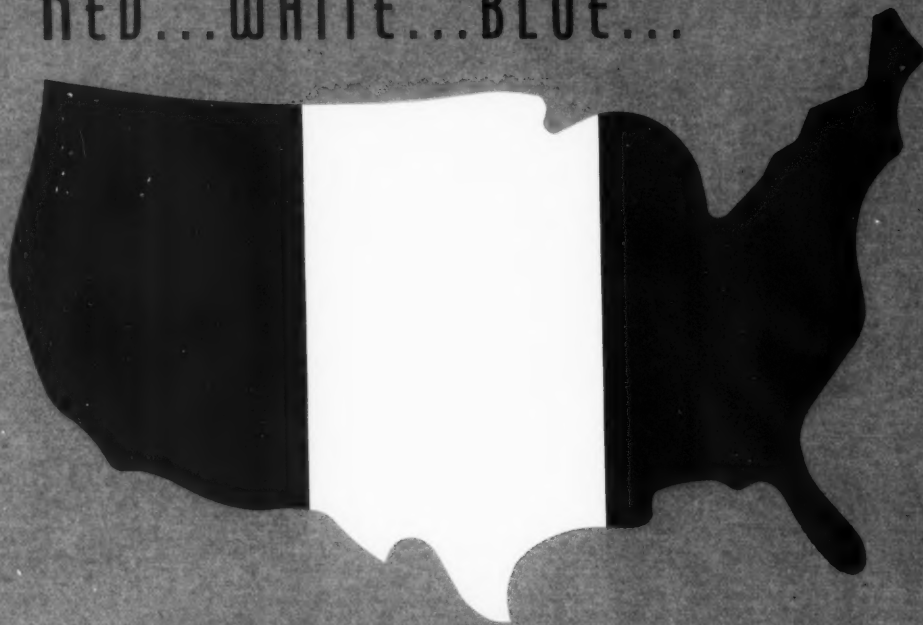
Parchment is not air-proof. Both air and moisture can penetrate it to a degree which will permit the contents of the package to "breathe." This quality is particularly helpful in the case of such foods as fresh vegetables, certain meats, etc.

Special inks are used in the printing of genuine vegetable parchment, since the printing must not offset when

1. Parchment sheets for individually wrapping poultry. 2. Parchment gasket between milk can and lid prevents contamination. 3. Parchment crate liner helps keep lettuce fresh. Photo Kalamazoo Vegetable Parchment Co.



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Upper: Parchment wrapping protects assorted cheese products in from one to four layers thick. Below: Familiar butter sizes in patties, quarters, single and double wrapped pounds. Photo Kalamazoo Vegetable Parchment Co.

used on greasy, wet, or briny foods. The inks must stand the boiling test, since in the dairy industry, butter wrappers and liners are boiled before use. Most wrappers are printed, and a wide choice of designs in color in both letterpress and offset, are available.

The weights of genuine vegetable parchment vary from 27 to 55 lbs., on the basis of 24 in. X 36 in.—500. In addition to colored parchment, waxed, coated, embossed, and crinkled forms are common. Treatments with glycerine and other substances are also used to give certain desired properties.

Special uses

Meat: In the meat-packing industry (including poultry), where it is essential that protective wrappings are attractive, resistant to grease, and not disintegrated in contact with meat juices, snow-white vegetable parchment has been widely adopted. A special treatment, which helps to prevent rancidity, is used on wrappers for sliced bacon, lard, and other fatty products. To prevent meats from sticking to metal containers, tins for spiced ham and luncheon meats are lined with parchment. Crinkled vegetable parchment—i.e., a sheet which has been creped or crinkled to increase its

strength—is used in packing houses to line containers for boiled ham and for other purposes. Poultry packers use vegetable parchment—frequently printed—as a lining for crates which, when turned back over the edges of the box, forms an attractive display. Other uses include liners and covers for boxes and barrels, wrappers for tamales. Most containers for lard—cartons, pails, drums and tubs—are lined with parchment. Vegetable shortenings require the same protection.

Dairy products: In the dairy industry, vegetable parchment is widely used as a wrapping for butter because of its freedom from taste and odors, and its high strength and grease-proofness while wet. Most containers for lard—cartons, pails, drums, and tubs—are lined with parchment. Vegetable shortenings require the same protection.

Cans for milk and cream use parchment gaskets between the can and the lid to prevent contamination from various sources. Parchment hoods for milk bottles are common. Many types of cheese and bricks of ice cream are wrapped in parchment. In the case of the latter product, parchment offers the advantage of stripping clean from the ice cream, leaving no paper shreds.

Garden produce: Fruit and vegetable shippers use parchment as liners for boxes and crates or as individual wraps or bands for lettuce, carrots, celery, broccoli, spinach, sweet corn, etc. Sometimes individual ears of sweet corn are put up in artificial husks, consisting of a parchment wrapper in which the corn is to be cooked.

Fish: The fish industry uses parchment for fresh fillets, and the same sheet, waxed for frozen fillets. The wax makes it easier to strip the sheet from the frozen product. A specially treated sheet of parchment is used as a lining by canners of shrimp, lobsters, crabs, etc., to prevent blackening of the contents from contact with the can.

Frosted foods: In the frosted foods industry, vegetable parchments, both plain and coated with paraffin, are used for fish fillets, fruits, and vegetables. For liquid or semi-liquid packs the paper is first fabricated into a bag, which is inserted into a carton and filled. The top is then folded over and heat-sealed.

Miscellaneous uses of genuine vegetable parchment include wrappings for grease-packed metal items like ball bearings; pads for permanent waving; wrappers and liners for oleomargarine; slap sheets and wrappers for the retail meat dealer or grocer; and a special grade of parchment for greeting cards.

Parchment paper is also being used extensively, now, in the lining of bags, fibre containers, etc., which replace tin and similar materials in the protection of a variety of moist and oily food products.

Certain parchments are also being used to wrap parts and replacements of military materials of highly polished metal which must be protected against tarnishing or rusting. Parchment provides an outer wrapper that is greaseproof, non-corrosive and sufficiently tough and strong to protect the part until it is actually placed in use.

Special sheets of genuine vegetable parchment have been developed to meet Federal specifications in this regard.

Printed Transparent Sheeting

IN the order of their development, there are three major processes of printing on transparent sheeting. These are as follows:

- 1) Letterpress, which employs relief engravings and oil inks.
- 2) Gravure, in which impressions are made from etched cylinders with lacquer inks.
- 3) Aniline, using spirit inks and, usually, rubber printing plates.

Which process would be most satisfactory depends on the following important factors:

A. Art work: Most designs can be printed in any one of the three processes with striking results. However, art work involving fine halftone screen, soft tone work or color process printing should be printed in the gravure process.

B. Nature of product: Certain products contain chemicals either inherent or added by processing which may attack the inks. For example, oil of wintergreen used in confections, such as mints, attacks certain aniline ink colors, whereas letterpress or gravure inks remain fast and, in the main, inert.

Packages for fruits processed with sulphur dioxide often employ the use of a protective metallic ink as a base for other colors. Most wrappers for these products have been printed in gravure, although some packers are using letterpress and aniline with satisfactory results.

C. Type of film used: While the type of film does not limit printing to any one of the three processes, the nature of the product and its handling in production and in the finished package form should be carefully considered in selecting film and printing.

Letterpress printing

This is the best known of all printing methods and is the one by which the first successful printing on transparent cellulose was accomplished. However, due to the temperamental nature of the film, really successful commercial production was not attained until roll-fed presses were employed. These required the addition of many devices, such as means of continuous control of the web, or sheet, during the printing operation, to insure registered printing of successive colors. Several types of roll-fed presses are presently in use. In some types, a number of printing or plate cylinders are arranged around a central platen cylinder and the printing is done on a continuous web, which is then delivered in the form of either sheets or rolls. Other types of presses cut the sheet to a predetermined size before the printing impression is made.

Letterpress printing may be done on either surface of the cellulose film and, where it is not objectionable for the printed side to come in contact with the product to be packaged, the use of reverse or underside printing

permits the retention of the full gloss, or sheen, of the cellulose, thus enhancing and vivifying the colors of the inks. Letterpress printing is also employed almost exclusively where the printed cellulose is to be used on moist or greasy objects, notably on meats and fish.

Gravure printing

This process came into use only after letterpress printing on transparent cellulose had become fairly well standardized and its limitations had been explored. The inks used are of the fast drying, lacquer type, which not only eliminate the use of slip-sheets, but permit the printer to obtain a degree of opacity impossible with oil inks, as well as to print color upon color in a continuous operation. The pigments used in gravure inks permit also, the obtaining of very brilliant full colors and shades, although only a limited range of tone effects are at present available.

Since gravure printing can only be done through the use of intaglio-etched cylinders, the cost of engravings for this process is relatively higher than for either letterpress or aniline printing and the combination of more than one design on a set of cylinders is impossible, unless all of the designs can be executed within the limit of the number of colors available on the press and unless each design, in repeat runs, can be produced at the same time and in the same proportion as to quantity as the original run. At present, presses are available where as many as seven colors may be produced at a single run.

The gravure method produces the highest type of printing at present available on transparent cellulose and particularly attractive effects are obtained through the use of reverse printing. Halftones can be satisfactorily reproduced, provided the tone work can be underlaid with a neutral color, such as white. Gravure printing is not recommended for use where the product to be packaged is greasy or has a high moisture content.

Aniline printing

This type of printing is the latest to come into use on transparent cellulose. Because it is generally done through the use of rubber, rather than metal printing plates, and because it employs fast drying inks, eliminating the necessity for slip-sheeting, it was originally hailed as a means of producing printed cellulose more economically than the older processes. However, the limitations of the processes and inks originally employed made aniline printing less satisfactory from the standpoint of package appearance and users of printed cellulose were loath to adopt it, even at somewhat lower costs. Since aniline printing was originally introduced, much progress has been made, notably just before the war, in improving the results obtained and some highly creditable work had already been done by this process. Naturally, the improvement of the process involved the

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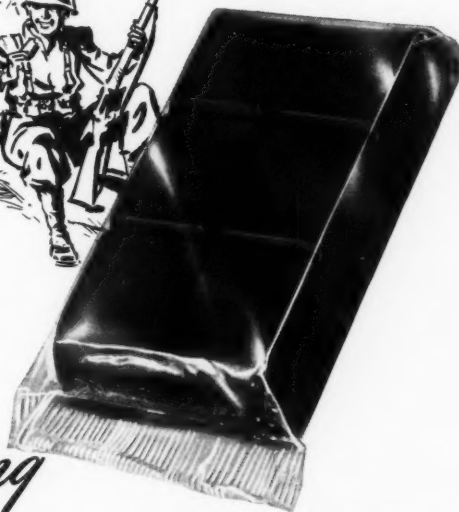


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PACKAGING CATALOG

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use of more expensive materials and equipment and the cost of aniline printing today is probably on a par with that of letterpress.

Tone work in aniline printing is possible only to a very limited extent and its use on moist or greasy products, particularly foods, is somewhat questionable. It does give excellent opacity, brilliant colors and, particularly in surface printing, a lustre that is superior to that of either letterpress or gravure.

The development of methods of printing transparent film in continuous rolls has contributed largely to the expanded use of such wrappers in mechanical packaging. Starting with the wrapping of bread, this application has spread into many fields. Controlled cut-offs, made possible by the use of photo-electric cells, permit "spot" wrapping the printed film on cartons or open faced trays. Photo-electric cells also permit the use of printed transparent rolls on machines which automatically form tubes, fill a predetermined amount of product and deliver individual completed packages, crimp-sealed top and bottom.

General information

Tints: Both gravure and aniline inks may be used in producing tints on transparent cellulose. A wide range of colors is available and the tints do not impair the gloss of the film. They alter its transparency only as the color of the tint reacts on the color of the product packaged. Letterpress tints are generally unsatisfactory, being inclined to muddiness.

Opacity: As mentioned in preceding paragraphs, gravure and pigmented aniline inks produce impressions of greater opacity than letterpress, although a degree of opacity suitable for many purposes can be obtained by the latter process.

Metallics: The gravure process is pre-eminent for printing metallics. Brilliance or opacity can be obtained with a single impression, although two layers of color may be employed where extreme opacity is desired. Letterpress metallics are very satisfactory in surface printing, where the metallic may be underlaid with a sizing, as of yellow in the case of gold, or white in the case of silver. Where reverse printing is employed, letterpress metallics cannot be underlaid and are correspondingly lacking in opacity. Satisfactory metallics for aniline production have not as yet been developed.

Reverse printing: All three printing processes may be employed to produce reverse printing, although letterpress is inferior to either gravure or aniline for this purpose, except where solid lays of full color are used.

Register: Where fine register is required, the letterpress process is superior to either of the others. The use of metallic plates, giving sharp, controllable register, permits the production of effects not possible with either gravure or aniline. Where the design is such that color may be superimposed on color, register often is of negligible account in gravure or aniline work.

Tone or screen work: Bendays and halftones are well within the range of most good producers of letter-

press printing on transparent cellulose. Halftone work is possible to a considerable degree in gravure, with a limited range of benday screens or stipple effects also available. The employment of such effects in the aniline process is definitely limited to date.

With the amount and character of the research work now going forward in the field of cellulose printing, it is not too much to expect that four-color process work will eventually be done on this material.

Package forms

Printed transparent cellulose is available in a variety of forms, the better-known of which are listed below:

Sheets: These are available in any type of film, printed in from one to seven colors, in practically any size.

Rolls: Continuous printed rolls of any type film are obtainable in widths ranging from 1/4 in. to 36 in., printed in from one to seven colors. Printed designs may be continuous or may be spot-registered for use on automatic packaging machines, where the printed design is accurately located on the package by means of a photo-electric cell device or an "electric eye."

Bags: Single or double wall bags of transparent cellulose, printed in from one to seven colors are available in flat, square and satchel bottom styles. Nearly all types of film may be employed in their construction. Sizes range from very small bags, in the flat type, up to 10 in. by 18 in. in the satchel bottom style.

Envelopes: Both die-cut and roll-cut styles are available in wide range of sizes with either side or end openings and with printing in any number of colors up to seven. Most types of transparent cellulose can now be successfully fabricated into envelopes.

Specialty packages: Tubes for cigars and other slender objects, such as tooth brushes, are available, printed in as many as seven colors and in most types of film. Other packages, combining printed cellulose faces with backs or affixed pieces of board or other material, may also be had. Sheets or rolls of printed cellulose, affixed at one or both sides to corresponding sheets or rolls of foil, glassine and other materials, are available. Other types of packages employ sheets or rolls of printed cellulose in combination with folding cartons or with fibre plates or trays; in some instances, such combination packages are supplied with retaining rings or other essential parts to make a complete package.

Laminated printed cellulose: This comparatively new development is treated at greater length elsewhere in this book. For the purpose of this article, it may be said that printed cellulose, laminated to a variety of base materials, is available in sheets, rolls, specific types of bags and folding cartons.

Window faced wraps: These have been developed essentially as a means of combining the advantages of opaque and transparent materials for wrapping purposes. They are formed by pasting together continuous alternate strips of paper and transparent film. In most instances, moisture-proof cellulose and grease-proof glassines are combined. They are most widely used in the baking industry, for the wrapping of candies, meat products, etc.



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Protective Coatings—Technical Aspects

by Robert Gordon

PRACTICALLY all of the resins and film-forming materials mentioned in this article have long since gone to war. These materials have been utilized wherever they fit and wherever they could release other strategic materials for more important requirements. Resins have made it possible to build airplanes and gliders without metal, raincoats without rubber, shoes without leather, fabrics without cotton, windows without glass and to obtain direct substitutes for many materials, the supply of which could not be increased sufficiently to meet the demands of our war effort.

Without the pre-war development of resins and without our ingenuity in substituting and developing the uses for these materials, we surely would have been in a position which is commonly known as "behind the eight-ball," as far as necessary war materials are concerned, especially after our losses in the Pacific and the Far East.

It is with little wonder, then, that these materials were, for all practical purposes, cut short for civilian use. Most of the resins have been placed under strict allocation by the WPB. Restrictions have not only been caused by war demand for the finished resins, but also because of the limited amounts of raw materials necessary to manufacture them.

The shortage of acetic anhydride, for example, has curtailed the production of cellulose acetate; the shortage of nitric acid has reduced the production of nitrocellulose, while the vinyl type resin production has been slowed up by the shortage of the monomers and phenol-formaldehyde resins by the shortages of phenol, cresols, and cresylic acid, modified isomerized and chlorinated rubber by the lack of rubber.

The greatest blow to packaging came when metals were restricted for use in cans and collapsible tubes. Almost every marketable item was hit between the eyes. The industry floundered desperately at first, but finally rallied and began to use to a great extent glass and paper coated with some protective materials in place of tin cans. Sealing, moisture-vapor transmission, water and oil resistance were the big headache with paper, but these difficulties were overcome to a great extent by whatever resins were available and by the less strategic waxes.

Conversion difficulties

The conversion from metal to glass and paper would not have been as difficult in itself had there been enough equipment and resins available to make the change. Packing in glass was not new by any means. Paper containers for liquids had been in development at least five years before the war started, and the biggest commercial use for such a container was for milk. Paper oil containers, too, have been seen on the market in

pre-war days, but tin was doing too good a job for a revolutionary change. The war, however, made the change necessary.

As mentioned above, many of the organic solvent soluble resins and film-forming materials are no longer available for civilian packages. There are, however, some water-soluble materials, such as glues, casein, alginates, silicates, polyvinyl alcohols and methyl celluloses which are available, excepting for the latter two perhaps, and which can be readily employed in treating paperboard for oil resistance. Such materials must subsequently be protected by means of a varnish or wax from being affected by water and moisture.

As for the collapsible tube, regenerated cellulose and cellulose acetate came to the rescue of metals. Although these materials were easily converted for use as tubes, protection by means of some type of coating against moisture and oil had to be applied to them in order to make them as practical and as resistant as the metals. Resins and waxes again played an important part in providing the essential resistance necessary in the tube.

One of the newest innovations of packaging liquids and other materials, which can be considered as a "war baby" is a fabric liquid container, developed by Standard Brands, Inc., which won an award in the twelfth All-America Packaging Competition. It is a fabric, coated with a heat-sealing and resistant material. The seams are made by heat sealing and the bag is packed in an ordinary corrugated container. This package has shown exceptional possibilities, and interest in it is growing steadily. Several articles on this package has already appeared in some issues of *Modern Packaging*.*

To understand coating materials, it may be interesting to trace briefly their beginnings. The word "lacquer" is derived from the Hindustani "lakh," meaning 100,000. It was originally given because of the thousands of insects whose resinous secretion was and still is the basis of many shellacs and natural gums.

Applying a protective or ornamental lacquer finish to wood, paper, metal or fibre is not new. It has been an art for centuries in China.

Whether a protective coating is classified as a varnish or a lacquer depends upon its method of drying. A lacquer dries purely from the evaporation of volatile solvents from the solution. A varnish dries chiefly by a chemical reaction known as oxidation.

Spirit varnish, therefore, really can be classified as a lacquer, but it is more like the lacquers used centuries ago than those classified as lacquers today. The latter are for the most part solutions of various gums and resins in alcohol.

* See item, "A Pillow in a Carton" on page 19.

The value of these spirit varnishes is due chiefly to their quick drying qualities and low cost. In most instances, where only a limited amount of protection is desired, these spirit varnishes are adequate. However, they have indubitable faults, such as a tendency to soften in warm weather and to crack in cold. Resistance to abrasion is sadly lacking.

Thus, it is not surprising that development of new synthetic materials, such as rubber derivatives, vinyl, methacrylate resins and cellulose derivatives are looked upon by the packaging industry with keen interest. In these new materials are new ideas and trends, new style, new methods, new beauty and new protection previously unknown. Applications of overprints are no longer being made merely for the sake of enhancing the appearance of a package or wrap, but also to incorporate such protections as resistance to oils, moisture, acids, alkalis and to the elements. In most all cases, the new materials give a good-looking finish, so that their effect on appearance is taken for granted and is subordinated to their protective properties.

Today many liquids and oils are being packed in paper containers. Many industries are effecting economies by the use of coated papers. Coatings have been used to protect whiskey labels from the effect of alcohol—soap wraps from discoloration and fading due to alkalis—oil labels from being stained by the oil—salt and cocoa from becoming caked by moisture in their containers.

One distinctive advantage of these new synthetic resin materials is their ability to seal with the aid of heat and pressure. Speed in production is increased greatly since the seal sets as soon as the temperature at which the seal was made drops a few degrees. Their bonds are stronger, more flexible, water-proof and do not deteriorate with age.

These rapid strides in the development of the new resins and their uses in packaging have been brought

about by carefully planned and directed research. Traditional methods are becoming "has beens." Wide-awake and alert companies who desire to keep up with these modern trends cannot afford to overlook the new possibilities which these materials offer to industry. A brief résumé of the new materials, their method of manufacture and uses for packaging follows:

Rubber derivatives

Rubber in one form or another has always been used for water- and vapor-proofing. However, its high viscosity, residual tack, lack of transparency and its general difficulty in handling have made it practically useless as a protective coating for paper. Through modern methods of research, a resin has been developed from a very high grade of rubber, which can be handled very much like any other coating solution adaptable for application to paper. Moreover, this resin, which is a cyclized derivative of rubber, is an improvement over the raw rubber in water- and vapor-proofness. It is soluble in a variety of aromatic and aliphatic hydrocarbons and leaves a clear, glossy, transparent, heat-sealing film highly resistant to moisture, acids, alkalis and alcohol. It contains no chlorine.

Another rubber derivative very suitable for use as a paper coating is a product known as chlorinated rubber or rubber chloride. It results from the reaction of chlorine on rubber in which the chlorine content may vary from 61.5 per cent to 68 per cent. The theoretical calculation of the chlorine content is generally higher than the practical since crude rubber is made up of a soluble portion which is very reactive and a gel portion which is much less reactive.

Both these above-mentioned rubber derivatives are extremely useful as a protective coating where good resistance to moisture penetration, acids and alkalis is desired. They can be formulated to produce good, flexible films with good gloss retention. The cycli-

Chemical properties of new coatings, showing their resistance to various characteristics of many packaged products.

GENERAL RESISTANCE								
	Cyclized Rubber	Chlorinated Rubber	Vinyl Copolymer	Polyvinyl Acetate	Acrylic Resins	Nitro Cellulose	Cellulose Acetate	Ethyl Cellulose
Acids Weak	excellent	excellent	excellent	good	good	fair	fair	fair
Acids Strong	excellent	excellent	excellent	good	good	poor	poor	poor
Alkalis Weak	excellent	excellent	excellent	good	good	poor	poor	excellent
Alkalis Strong	excellent	excellent	excellent	good	good	poor	poor	excellent
Salt Spray	good	good	excellent	good	fair	poor	poor	fair
Alcohol	excellent	good	excellent	poor	poor	poor	poor	poor
Gasoline	poor	good	excellent	good	fair	good	good	poor
Mineral Oil	poor	good	excellent	good	fair	fair	good	fair
Vegetable Oil	poor	poor	excellent	good	fair	poor	good	poor
Animal Oil	poor	poor	excellent	good	fair	fair	good	poor
Essential Oil	poor	poor	poor	poor	poor	poor	good	poor



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PHYSICAL PROPERTIES

	Cyclicized Rubber	Chlorinated Rubber	Vinyl Copolymer	Polyvinyl Acetate	Acrylic Resins	Nitro Cellulose	Cellulose Acetate	Ethyl Cellulose
Specific Gravity	1.07	1.57	1.35	1.20	1.18	1.65	1.27	1.14
Specific Volume, In. ³ /Lbs.	26.0	16.98	20.6	24.2	23.3	16.26	20.2	23.91
Color	very light	light brown	water-white	water-white	water-white	very light	water-white	very light
Odor	none	none	none	none	none	none	none	none
Taste	none	none	none	none	none	none	none	none
Flammability	none	low	none	none	none	high	none	low
Heat Seal	excellent	poor at high temp.	excellent	excellent	excellent	fair	fair	good
Resistance to Aging	fair	fair	excellent	excellent	excellent	poor	excellent	excellent
Water Resistance	very good	very good	very good	poor	good	fair	poor	poor
Water Vapor Impermeability	excellent	excellent	good	poor	fair	good	poor	poor
Toxicity	none	none	none	none	none	none	none	none

Physical properties of the new materials particularly important to those who use these new synthetic coatings.

cized rubber derivative, however, is more suitable for heat-sealing purposes, since it is more stable to heat than the rubber chloride and is produced in various grades with various melting points. Both of these materials are not affected by alcohols, but are attacked by gasoline. Their use on glassine or other hard surfaced papers has given results which make these coatings extremely useful in packaging where high moisture resistance is required. On glassine paper, the cyclicized rubber derivative is used with as little as 1½ lbs. per 3,000 square feet of solid coating on each side of the paper to give moisture-vapor transfer rates of from 1 to 5 grams of water per square meter per 24 hours at a relative humidity differential of 100 to 0 per cent, compared with the uncoated paper, which has a moisture-vapor transfer rate of over 1,000 grams per square meter under the same conditions. This same cyclicized rubber derivative is also used on kraft paper to give a high strength sheet which is very resistant to the passage of moisture. This sheet has a high finish, is heat-sealable, and offers many opportunities for using high strength paper in the field of large commodity bag packaging.

The outstanding advantage of these coatings is that they are non-toxic and usable for food packaging where high moisture resistance is required to prevent caking of such items as salt and cocoa or to prevent staleness of biscuits, corn flakes, potato chips, pop corn, etc.

The chemical resistance of these rubber derivatives allows for wrapping and packaging of such materials as soaps and detergents and prevents discoloration of the wrap by the alkalis.

Vinyl polymers

Vinyl chloride and vinyl acetate are formed by passing acetylene through hydrochloric acid and acetic acid, respectively. The molecules of these compounds are

possessed with the characteristic of joining together with other like molecules to form larger molecules possessing the same empirical composition. Thus, when vinyl chloride and vinyl acetate are each treated with catalysts, they each polymerize to form polyvinyl chloride and polyvinyl acetate, respectively. This chain reaction can be controlled to various degrees of polymerization and the degree of polymerization determines the average molecular weight, as well as some of the important properties of the polymer.

Polyvinyl chloride is strong in tensile strength with good chemical and water resistance. However, it has poor solubility in most organic solvents and is, therefore, limited in its use for a surface coating.

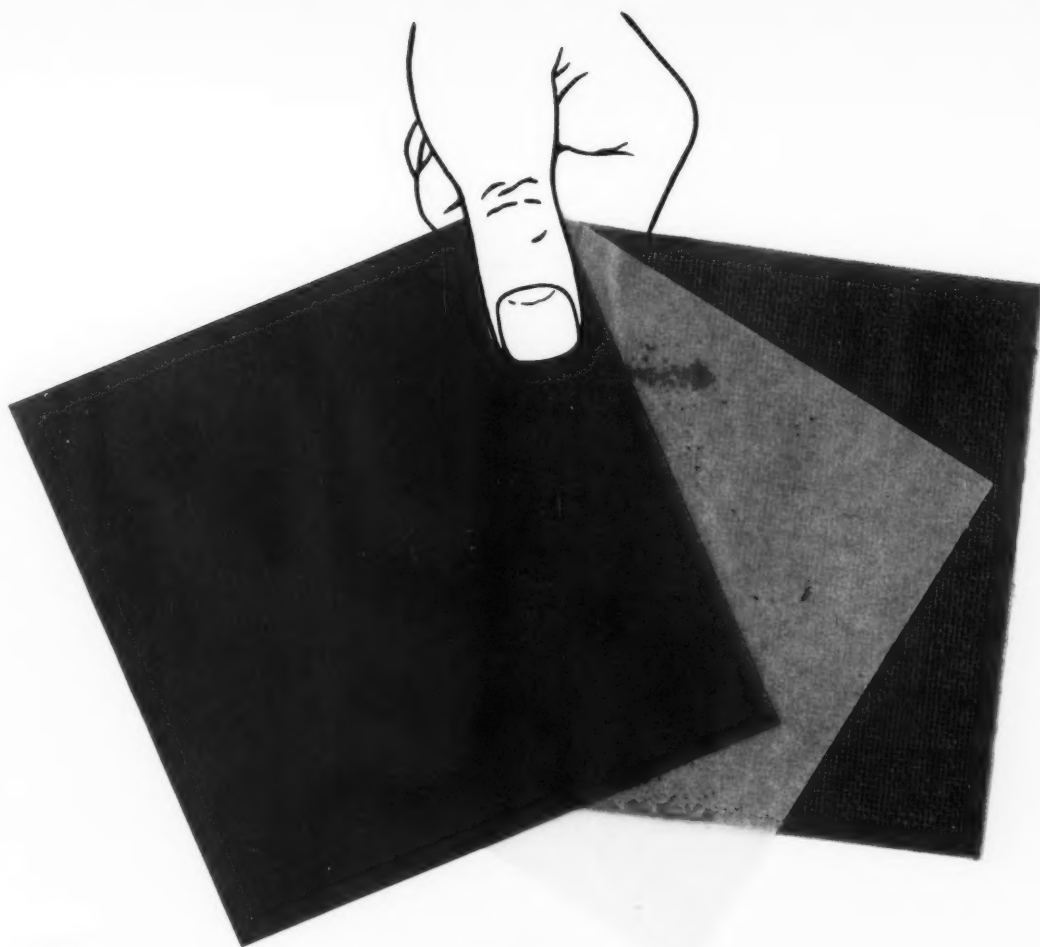
Polyvinyl acetate, on the other hand, has properties which are quite different. Its softening point is as low as 30° C. and it has a high water absorption and tacky nature. It is more useful, consequently, as an adhesive rather than a surface coating.

A joint polymerization of these two compounds simultaneously, however, with a content of about 85 per cent to 87 per cent vinyl chloride yields a product which is soluble in many organic solvents suitable for use as a medium for adapting the resin for surface coating. What actually happens is that the vinyl acetate, when polymerized together with the vinyl chloride, internally plasticizes the polyvinyl chloride while retaining most of the properties of the polyvinyl chloride.*

A large variety of compounds can be made with varying properties by the copolymerization of these two materials, by controlling the average molecular weights and by altering the vinyl chloride-vinyl acetate ratio.

Vinyl resins of this nature find their most extensive uses in paper coatings where good resistance to acids, alkalis, oils, gasoline and alcohol is required. They

* These copolymers of vinyl acetate and vinyl chloride are manufactured and sold under the name of "Vinylite."



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have already found successful application in paper liners for bottle caps, fibre containers for holding oils, fibre cartons used for packing nitrocellulose which is kept wet with denatured ethyl alcohol, labels and box papers for improving the appearance as well as for resistance to the above-mentioned materials.

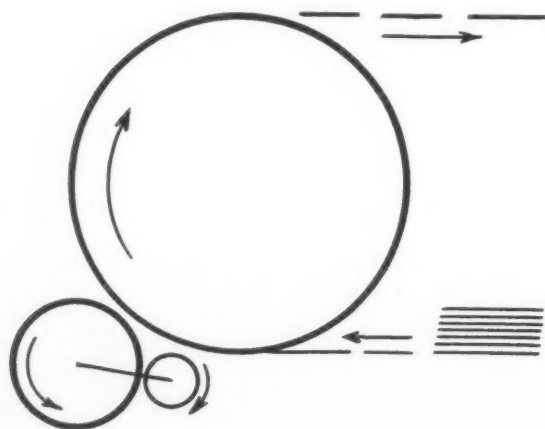
Vinyl resins in general have excellent heat-sealing properties, water resistance, are non-toxic, odorless, tasteless and practically water-white. This makes them ideal for use in food containers and wrappings. They have been used for packaging dairy products, such as butter, cheese and on hoods for milk bottles.

The vinyl acetate polymers have extremely high thermo and cold adhesive qualities, and are quite extensively used as adhesives in the packaging field. They, too, are non-toxic, odorless, tasteless and colorless, but the water absorption is rather high. However, water does not dissolve polymerized vinyl acetate. This type of resin is used for sealing paper milk containers, paper drinking cups for both hot and cold liquids, as well as a seal for cellophane and cellulose acetate film. It can be coated by the regular methods and it makes excellent heat-sealing papers.

Methacrylate resins

The methacrylate resins also belong to the vinyl group, chemically speaking, and are made basically from coal, air, water and petroleum. These resins are made from various esters such as ethyl, methyl, butyl and isobutyl derivatives. To date, the most extensive use for acrylic resins has been in molding. However, they are soluble in a large variety of solvents and are suitable for coating. The ethyl methacrylate, however, is probably the best suited for this work, since the methyl polymers which are used chiefly in plastics are too hard and brittle for coating. The butyl polymers, moreover, are too soft and sticky. The acrylic resins are water-white, thermoplastic and have good resistance to water and inorganic chemicals. They have not been fully explored as yet in this particular field, in as much as they have been very costly.

Fig. 1. Diagram of varnishing machine for sheet coating.



Polystyrene resins

Polystyrene resins also known as vinyl benzene have ideal potential properties for protective coatings. However, their one drawback is their hardness and lack of flexibility. Formulating chemists spent many hours trying to make a usable, flexible polystyrene coating.

Cellulose derivatives

Nitrocellulose, ethylcellulose and cellulose acetate have also been used to a great extent for coatings of paper. However, their usefulness is much more limited than the other mentioned thermoplastic, high molecular weight, film-forming resins. Good moisture-resistant nitrocellulose lacquers and fair oil-proof cellulose acetate, as well as good thermoplastic coating from ethylcellulose, have been made. However, these materials do not have as many inherent physical and chemical properties as do the thermoplastic resins. They have to be modified in so large a measure by other ingredients that, in many cases, they lose their advantages. In paper work, these materials have found large uses in coated labels and fancy box papers. Moisture-proof nitrocellulose lacquers have been used on both cellophane and glassine with good results. The one outstanding disadvantage of nitrocellulose lacquers is their high rate of inflammability. This requires extreme care in handling and storing.

In general, all coatings mentioned give good scuff-proofness and good gloss, which enhance the appearance and serviceability of the package.

The thermoplastic type of materials is best suited for heat-sealing work and bags can be made and sealed only with heat and pressure. In general, temperatures of approximately 300° to 400° F. are required.

The statements above are all relative and general. The efficiency and advantage of any of the mentioned materials will depend upon the precise development by the lacquer manufacturers of these materials for particular uses. In application, the lacquers made from these new synthetic bases vary little from the conventional methods of coating. However, certain facts must be taken into consideration if the best protection and appearance are to be obtained. First, let us consider briefly some of the established methods of application, their shortcomings and the modern trend to improve these methods.

Coating in sheets is generally accomplished on a so-called varnishing machine, which consists of a reservoir in which the liquid is poured. Running in this reservoir is a distributing roller with an attached doctor roller, which regulates the amount of coating to be applied to the sheet. The sheet is drawn over the distributing roller by means of a large revolving drum equipped with grippers. These grippers hold the sheet firmly to the drum as it revolves. At the same time, they draw the paper over the distributing roller with the regulated amount of coating. The sheet picks up the coating, is then released on an endless belt and carried through a heated oven to be dried. See Fig. 1.

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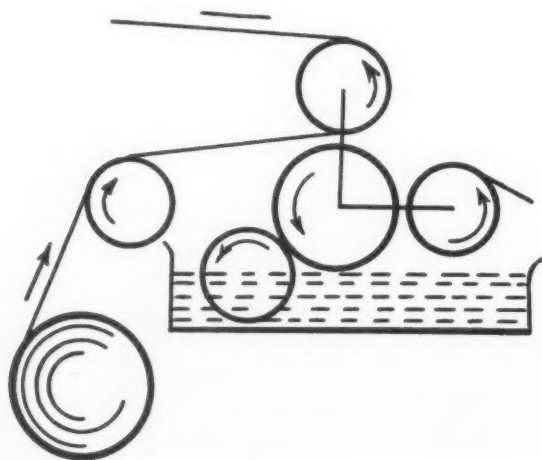
Although this type of equipment has served the industry successfully for years in applying spirit varnishes chiefly for good appearance without much damage, a little more careful handling and thought to details must be given if coating by this method is to be used successfully for protective application. Like the chain with its weakest link, the protective quality of the finished product is only as good as the continuity of its film. Pinholes, bare spots and not enough coating render the sheet useless from this point of view.

The machines have been modified to the extent of varying the speeds of the distributing roller, so that the sheet wipes against the roller instead of kissing it. The modification tends to eliminate any streaks in the coating and to provide for more uniformity and a wider range of thickness control. Another modification has been to reverse the distributing roller in such manner that it runs in the opposite direction to the motion of the large drum and the sheet and thus lays down a smooth streakless coat. This is, perhaps, the best method. However, since the operating details have not as yet been satisfactorily worked out, more information is not available at present.

The second method to be discussed is the reverse roller coating equipment, of which there are several different types for production in the web or roll, rather than sheet. At present, there is no question about the merits of this type equipment. With these machines, accuracy and uniformity can be obtained satisfactorily without much difficulty.

One reverse roller type of machine consists essentially of a roller about half submerged and operating in a tank filled with lacquer. The paper runs over this roller in the opposite direction to its motion, picks up the lacquer and is carried between two rollers attached in wringer fashion. One of the rollers is stationary and revolves in the direction of the paper. The other roller is adjustable and operates in reverse direction to the movement of the paper. To the adjustable roller is attached a doctor blade which wipes down the excess

Fig. 2. Reverse roller type coater has a roller about half submerged in a tank which is filled with lacquer.



lacquer which is picked up from the paper. Very accurate results for the weight of coating can be obtained from a machine of this type. In fact, actual calculations of the amount of coating to be applied can be determined before operation starts. See Fig. 2.

Another popular type of reverse roller coater has a roller operating in a lacquer bath. To this roller is attached a distributing roller, which picks off the lacquer from the roller in the bath. To the distributing roller are connected two adjustable auxiliary rollers at approximately 90° from one another. One of these auxiliary rollers has a doctor blade attached to it, operates in reverse of the distributing roller and regulates the amount of lacquer on the distributing roller.

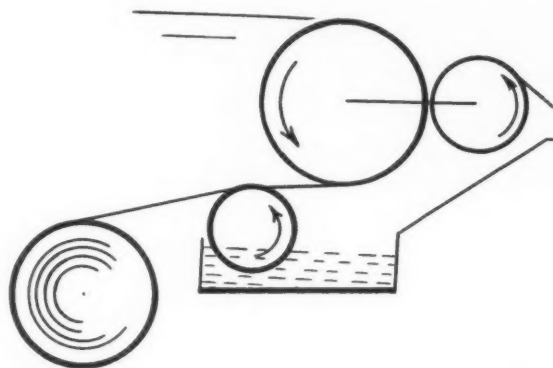


Fig. 3. Another type of reverse roller coater has a roller, operating in a lacquer bath, attached to distributor.

Between the second auxiliary roller and the doctored-off portion of the distributing roller, the paper passes also in a direction opposite to the rotation of the distributing roller. See Fig. 3.

Rotogravure printing is also being used to apply lacquers to paper in web form. Recently presses have been designed with closed fountains, which are ideal for lacquer work. However, rotogravure applications of lacquer for protective work have limitations: first, in the amount of coating applied and second, in the continuity of the film. The lacquer is applied by means of etched rollers. Caution must be taken with the formulation of the lacquer to be sure that it flows out to a uniform film before drying.

After the lacquer is applied, the sheets or web pass through a heated oven. These ovens are generally 30 to 40 ft. long and are constructed of sheet iron lined with asbestos. The source of heat is either the open gas flame, steam coils, hot air or, more recently, infrared lamps. Of all these, the open gas flame is the least desirable, since it affords a definite fire hazard when used with lacquers.

Although many of the lacquer bases are non-inflammable, the solvents used in them will flash at relatively low temperatures. The other types of heat are safe and, with such other necessary precautions as adequate ventilation, static control and proper electric equipment, little is to be feared from the fire hazard.

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Full view of coating machine, drying tunnel, cooling and windup where the heatseal application is made on the cellophane surface of the mounted war packaging material. Photo Reynolds Metals Co.

about by the use of synthetic coating materials. It has been found that thermoplastic compounds will flow out when sufficient heat is applied to make them melt. Since the heat required to bring about this change of state is generally high enough to scorch the paper, the heat is applied only for an interval of 5 to 10 seconds, depending upon the amount of heat used. In most cases, about 400° F. is used for 5 to 10 seconds after the heated sheet has passed through the regular oven at 150° to 200° F. The result of this flash bake is a beautiful, smooth, high gloss finish on the paper.

With infra-red lamps, no ovens are required, since the air is not used as a medium for conveying the heat energy. Infra-red lamps give off rays which are not absorbed by air. The efficiency of this method, however, depends on the material being heated. That is, such material has the ability to reflect or transmit rather than to absorb these radiated rays, no amount of drying time will be adequate. However, if it does have the ability to absorb these rays, excellent drying facilities by this method can be arranged. Paper absorbs only a small amount of these rays, especially if the paper is white, and it is believed to be an impractical method of drying lacquers efficiently on paper.

The selection of the proper grade of paper is of vital importance to obtain maximum results. A grade of paper not suited for lacquering is extremely costly and the results are inadequate. Too much emphasis cannot be placed on the selection of paper stock. In considering paper for a protective lacquer, it must be remembered that it is only the film formed above the fibres that gives the most effective protection. Consequently, it goes without saying that papers which allow the least amount of coating to penetrate into the surface of the sheet are best.

A convincing illustration of this fact was demonstrated in work with moisture-proof lacquers. In an application of approximately 1½ lbs. of solids on each side of a glassine sheet over a 3,000-sq. ft. area, a series of readings were obtained between 0 to 5 grams of moisture-vapor transmission per 24 hours per square meter. In an application of coating to a paper stock that was

picked at random, but which was being used for lacquering, readings were between 50 to 60 grams of moisture penetration. It wasn't until about 3 to 4 lbs. of coating were applied to each side that favorable readings were obtained for the paper picked at random. Furthermore, an additional amount of coating on the glassine sheet gave no better results than the initial amount stated above. Thus, there is a limit to the amount of protection you can get and this maximum limit can be obtained much quicker and at a greater saving with the proper paper. It is much cheaper to treat a paper properly in the mill for good lacquering results than to apply an excess of lacquer to make up for the deficiency of the paper.

Paper to be used for lacquering should have a hand surface free from pores, grooves and standing fibres. In most cases, a supercalendered sheet or a coated sheet produces the best results. The coated sheet is superior, however, to the supercalendered sheet, inasmuch as there is less penetration into the paper. However, great care must be used in the selection of a coated stock. The coating should be hard but flexible, since the lacquer film will crack if the paper coating cracks upon flexing.

In buying competitive lacquers the purchaser should obtain the following salient facts in order to evaluate them on a dollar-for-dollar basis:

1. Knowledge of what you want the lacquer to do.
2. Weight per gallon.
3. Percentage of solids per gallon.
4. Specific gravity of solids or how far it will go per unit of thickness.

Lacquers, in many cases, can be formulated to give you the best results for certain types of protection. It takes much less lacquer to do the best job, if you select one specifically designed. Knowing the weight per gallon, the percentage of solids and the specific gravity of the solids, you will be able to evaluate the cost of competitive lacquers—assuming, of course, that their properties are equally as good.

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PACKAGING CATALOG

353

Lacquer Uses in Wartime Packaging

by Paul H. Yoder

IN PRESENT-day usage, the word "lacquer" has come to mean any coating material which hardens by the evaporation of the organic solvent vehicle.

On the basis of this definition, lacquers are made from a large variety of materials, such as nitrocellulose, cellulose acetate, acetate butyrate, ethyl cellulose, vinyl derivatives, cyclicized and chlorinated rubber, vegetable proteins, and methacrylate and other polymers in combination with suitable plasticizers and modifying agents. Generally in the packaging industry lacquers are unpigmented and transparent, although for specific applications, dyes and pigments may be mixed in the lacquers.

With the present restrictions on raw materials and the fact that most of the raw materials used in formulating lacquers are products of the chemical industry, the uses of lacquer in packaging are restricted to essential products such as foods for civilian use and the armed forces; packing spare parts for war machinery, and in helping provide satisfactory substitutes for strategic metals.

Many of the present uses of lacquer are as coatings on relatively plentiful cellulosic base materials such as paper and regenerated cellulose. The widest single use is on regenerated cellulose for producing a transparent film which is moisture-vaporproof, greaseproof, relatively water-proof, and which may or may not be heat-sealable. The lacquers ordinarily used on this base are of the nitrocellulose type, in which innumerable formulations are possible to provide various degrees and types of protection. Transparent sheetings of this kind are used by themselves in the form of bags, as loose liners for cartons, as exterior loose wraps for cartons or packages, and as

tight wraps on cylindrical containers. In order to develop a higher degree of protection, the sheets may be laminated to themselves, to paper, metal foil or paper board and with lacquer type adhesives or permanently plastic waxy types of adhesives. These structures are finding wide application in packages for highly hygroscopic materials, such as dehydrated foods, fruit juice powders, dry milk powders and in cap liners.

Due to the necessity for replacing metal packages with those made from more plentiful materials, lacquers are being used in many applications to help produce highly efficient fibre wall cans for dry products. In this use, the lacquer is usually applied on the outer ply of a spirally or convolutely wound can, this ply usually being a printed label. The lacquer is applied in a thickness of approximately 0.0003 in. over the printed surface. For many products, the lacquer alone does not provide a sufficient degree of moisture-vapor resistance, but prevents the chipboard body of the can from rapidly absorbing moisture from a humid atmosphere and becoming soggy. It prevents the plies from separating due to softening of the adhesives customarily used. In the case of fibre oil cans, lacquer is used on the label to protect it from disfigurement by the elements and handling. Due to restrictions imposed by the war, most lacquers for labels of this character are of the nitrocellulose type.

Glassine, vegetable parchment and greaseproof papers, either as single thicknesses or in laminations, are lacquered to produce moisture-vapor resistant and, in many cases, heat-sealable structures. Such papers are used in the form of bags for packaging shortening, pudding powders, frozen foods, machinery parts, dehydrated foods and rations, as wrappers for bread, photographic film and bakery products, and as liners for cartons where moisture-vapor protection, flavor retention and greaseproofness are required of the packaging material. Lacquers for papers such as these are usually of the nitrocellulose and ethyl cellulose types.

As previously mentioned, raw material shortages, with few exceptions, are restricting the use of lacquer to essential uses. There are, however, certain vegetable proteins which are available in relatively small quantities for non-essential uses. However, the characteristics of the lacquers made from these materials are such that the applications are relatively few. Gloss and grease resistance are good, but water resistance and moisture-vapor resistance are marginal.

The tin shortage has created a problem in the manufacture of collapsible tubes and tin cans for non-processed foods. In the case of collapsible tubes, lacquers of various types are being used on lead-body tubes to keep the contents of the tube from contact with the lead. In cans for non-processed foods, lacquers are replacing the tin coating on blackplate to prevent corrosions of the metal.

Paper cans protected by lacquer coated labels (left) adequately replace former lithographed metal containers for hygroscopic products. Photo Pyroxylin Products, Inc.



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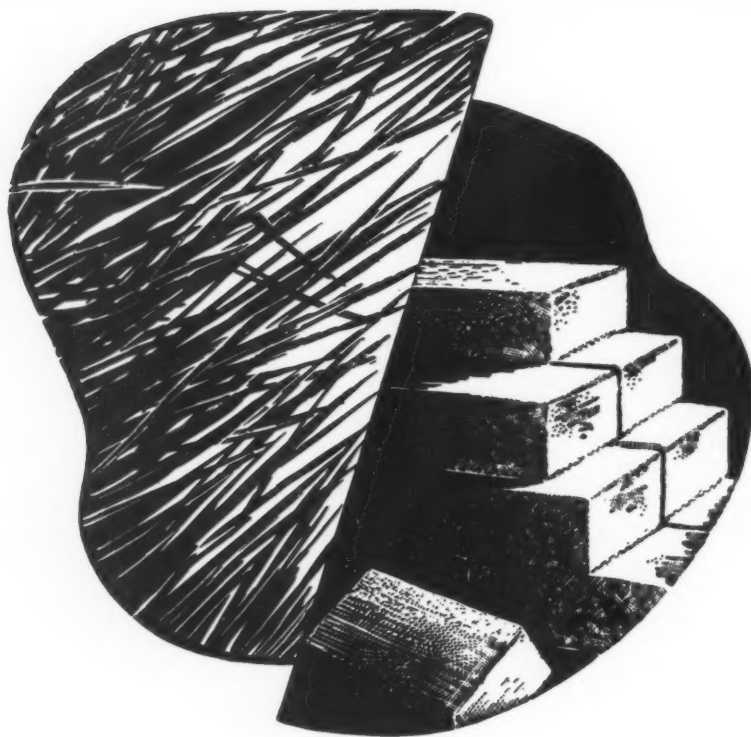
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Special Papers for Packaging Purposes

by Arno W. Nickerson

PAPERS of various types, sized and unsized, decorated and plain, have long been used as an inexpensive wrapping or packaging for small and large size units, either in the form of a sheet, bag, folding box, set-up box or a shipping container.

Impact of the second World War has greatly emphasized the necessity for protective packaging of food-stuffs and metal parts, as well as thousands of other items, to be shipped to all corners of the world, wherever the fighting forces may be and under conditions of handling undreamed of in domestic commerce. Such packaging must be resistant to temperatures as low as -20° F. and as high as 130° above, with relative humidities within the full range. Shipping containers may be even dumped overboard from a ship and floated ashore in a net, where the goods may be piled on the beach without protection from the moist sand below or from rain or snow. This requirement, coupled with the lack of tin and other metal containers, has stimulated the paper and board industry to achieve an unheard-of rate of protective development. All this must be done by using non-critical materials; further, the design of package must be such as to make possible shipment from the box-makers' plant to the packing plant with minimum of freight space. When received, these cartons must be adapted to standard automatic filling and sealing without highly specialized equipment.

How difficult this development task has been can be illustrated by enumerating some of the characteristics demanded by users of special papers, notably the armed forces. Among the properties in the strictly utilitarian category are:

- | | |
|----------------------------|---------------------------|
| 1. Dry Strength | 11. Fireproofness |
| 2. Wet Strength | 12. Tarnish Resistance |
| 3. Rigidity | 13. Counterfeit-proofness |
| 4. Pliability | 14. Water Resistance |
| 5. Softness | 15. Heat Resistance |
| 6. Cleanliness | 16. Heat Conductance |
| 7. Smoothness | 17. Rodent-proofness |
| 8. Moisture-vaporproofness | 18. Insect-proofness |
| 9. Alkali-proofness | 19. Gasproofness |
| 10. Greaseproofness | |

The industry cannot claim that it has achieved a package that will meet all of the above requirements, but the end use to which the package is to be put has been carefully studied and the properties each package must possess have been carefully defined. Every effort is being made to meet the requirements.

Exterior decoration of packages for the armed forces is not a pronounced factor, as this consists largely of identification markings in one color to which is often added descriptive methods for use of the goods which are

packed; this description may be printed in several languages.

The major groups or classifications in which these protective papers are classified may be defined as follows:

- Regenerated cellulose for moisture-proofness
- Carbohydrates
- Vinyl Resin—impregnated or Coated Products
- Melamine resins
- Rubber base products
- Parchment—treated or untreated
- Glassine—treated or untreated
- Lacquer treatments
- Heat-sealing treatments
- Asphalt combined papers
- Tin and lead foil combined papers
- Protein derived from corn and other starches as a coating or as a portion of the furnish in paper making
- Micro crystalline wax used as an adhesive and as a dipping compound

Specifications: The following represents a late specification of impervious papers used for packaging purposes:

1. Moisture-vapor penetration (M.V.P.)—.05 gram per 100 sq. in. per 24 hours (creased) by the Institute of Paper Chemistry method or by the Southwick method.
2. Odorless
3. Non-toxic
4. Flexible at 20° F.
5. No loss of characteristics at 130° F.
6. Burst of 30 pounds or better
7. Capable of being heat sealed by a moisture-proof strength seal
8. Capable of being handled by present packaging machinery
9. Water-resistant
10. Insect-proof

Materials to be packed: The most pronounced demand has been in the field of packaging small metal parts which are subject to corrosion in shipment from point of manufacture to point of assembly. When finally assembled, machines made from corrosive metal are over-all packed in highly protective papers or films before being placed in a suitable outer container. Hygroscopic agents are also used to reduce moisture.

Dehydrated food: The latest estimates indicate that more than 1,200 dehydrators in the United States will pack a grand total of 600,000,000 pounds of dehydrated soups, fruits, vegetables and meats in 1943. Many of these products will be compressed after dehydration into cubes or bricks to achieve still further space saving in shipment. Powdered eggs and dried milk have



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Laminating methods: A wide range and types of combining machines are already in use. By combining a highly resistant treated paper to a sheet of less protective paper and also to a more rigid sheet, such as box-board or test liner board, the range of protective packages becomes almost unlimited. One of the modern units used for this purpose is shown schematically in Fig. 1, in which five plies of different types may be brought together with any type of adhesive desired and designed to operate at speeds up to 700 ft. per minute and deliver the combined construction in sheets.

Tarnish and rust-resistant papers

For wrapping metals sensitive to sulphur the most common papers used are a rag, sulphite or well-washed sulphate sheet of tissue weight (8 pounds — 20 X 30/480). This sheet must be free from acids and chemical impurities and is used for wrapping silverware, aluminum goods, leaded glass, tooth paste tubes and other tarnishable articles. The United States Bureau of Standards specifies that anti-tarnish tissue for wrapping silverware must contain not more than .008% sulphur.

The common method of testing is to wrap the polished silver article in the paper to be tested and heat in an oven for one hour at 100° C. Inspection of the metal article promptly indicates whether there is a tendency for the paper to contribute to tarnishing.

Inhibitors often used in manufacture of paper and paperboard for wrapping or packaging purposes include copper salts, and often lead acetate has been used as a part of the furnish to reduce the free sulphur.

Cotton linings: Cotton-lined paper in the form of a bag or a sheet is often used where anti-tarnish qualities are desirable. The soft lining serves to absorb shipping shocks as additional protection. Flannels of anti-tarnish type are often used to wrap silverware or to line boxes in which silverware is packed.

Cellophane bags: Cellophane is often used in the form of a bag or a sheet to protect polished metal articles, such as silver, copper or brass.

Rust prevention

Closely related to tarnish prevention is the problem of rust prevention, a problem affecting exporters and those who ship by water in particular, but affecting all manufacturers of metal packaged products to a degree.

A number of water-proof papers are available, consist-

ing essentially of two sheets of kraft paper of various weights with a layer of water-proof asphalt between. One or both sheets of paper may be creped to provide for stretching in one or both directions. Water-proof papers can also be obtained with a reinforcement of cotton or jute cords imbedded in the asphalt between the two sheets of paper.

These papers are extensively used for wrapping textiles, tires and metal products. Water-proof papers may also be obtained in combination with burlap, cotton cloth, jute fibre or thin sheets of metal foil. Coils of steel and rolls of cloth are frequently wrapped spirally with strips of this burlap paper.

Where such water-proof wrappings cannot be used for physical reasons or for reasons of expense, some manufacturers have found it practicable to insert into the shipping container bagged quantities of silicate jell (silica gel)—a chemical having the ability to absorb large quantities of moisture. This serves to hold down the relative humidity within the container over an extended period of time, maintaining this below the critical point of 30 per cent and thus effectively eliminating the formation of rust.

Special coatings

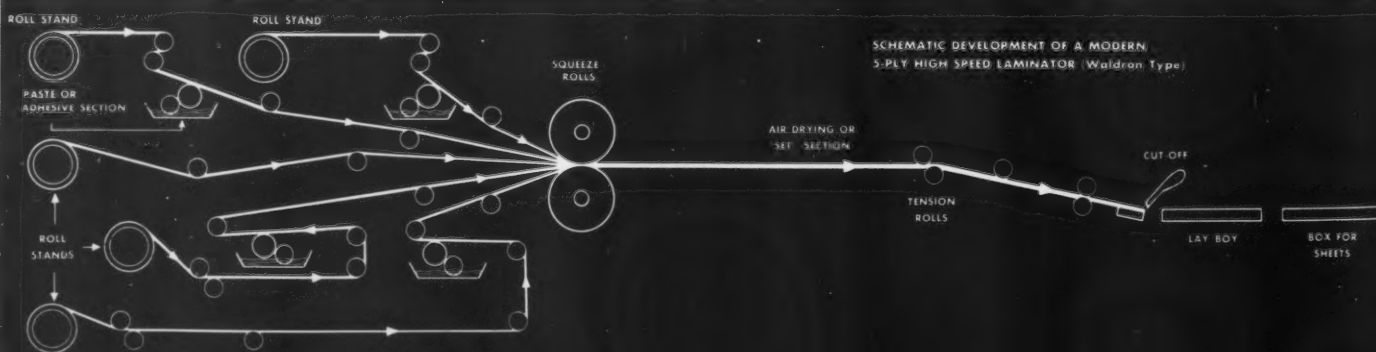
Air-brush coatings: A process in which a liquid mixture of coating pigment and adhesive is atomized by an air pressure spray and then sprayed onto the moving paper web.

Air-knife coatings: A process differing from that described above in that a thin flat jet of air is used to remove the excess coating from a freshly coated sheet. The coating is applied in excess quantities and in a semi-fluid state by means of a roll applicator which coats the paper. It is removed immediately by the air knife which also helps to give a smooth surface to the remaining freshly applied coating.

Casein coatings: Widely used in the sizing of papers. This material is a protein obtained from milk.

Diaphanic papers: A highly transparent paper made of a chemical wood pulp. It is printed by a lithographic process and then impregnated with a lacquer containing turpentine. The dried sheet is treated with an adhesive by means of which it can be applied to a glass surface. Occasionally used for label purposes on glass containers.

Dope: Trade term signifying a solution of cellulose acetate or cellulose nitrate or ethylcellulose or benzyl cellulose in a volatile solvent such as acetone for use as a coating material.



ACRES OF PLANES and CONTAINERS BY THE MILLIONS



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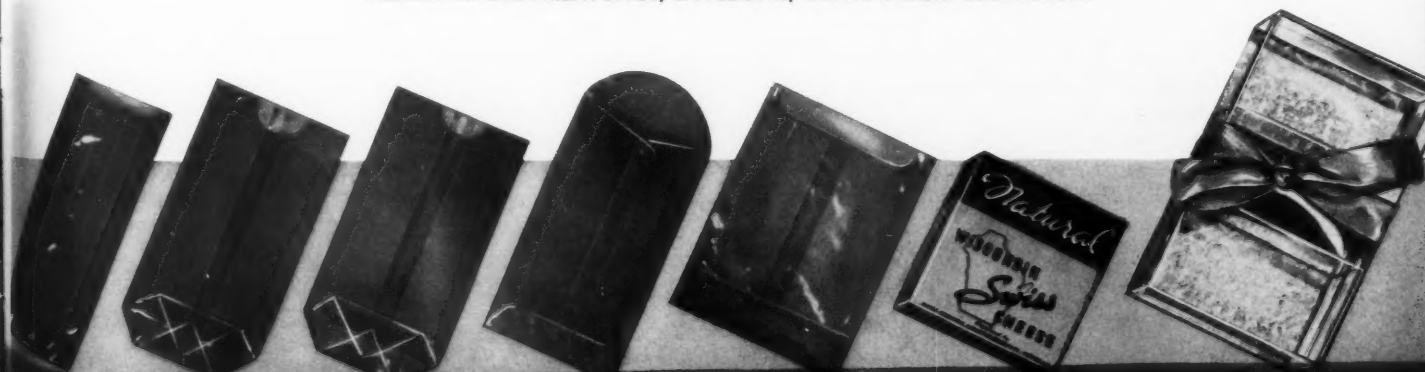
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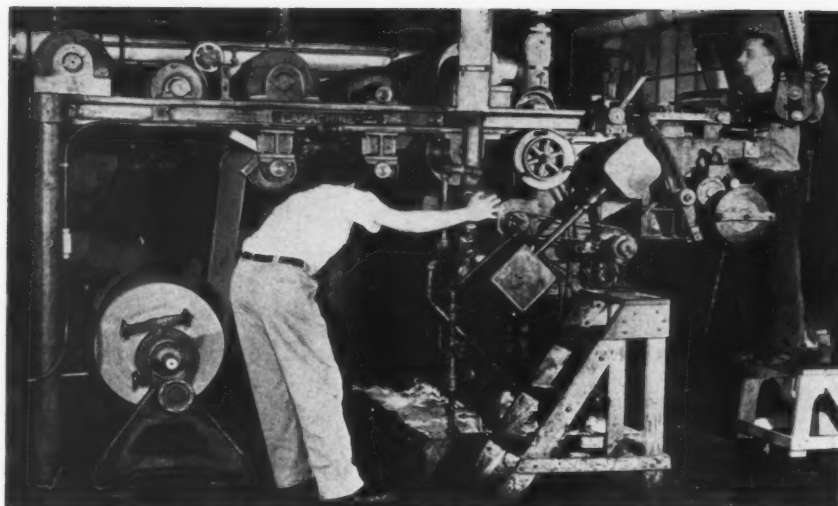
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Side view of the asphalt compound laminating machine, combining metal, paper and asphalt. Photo Reynolds Metals Co.



Dry coatings: Another term frequently used for hot melt coatings.

Duplex asphalt paper: A water-proof paper formed by laminating two sheets with a film of asphalt. Generally used for fibre containers and for moisture-proof bags.

Glycerin: Used as an impregnating agent in some instances where products to be wrapped must be protected from air carrying moisture.

Heat-sealing papers: Many varnished and lacquered papers have heat-sealing qualities which facilitate their use on modern packaging machinery. Among these are varnished and lacquered papers in which the coating has incorporated in it quantities of resins or other thermo-adhesive materials. Hot melt coatings are, by their very nature, heat-sealing since they will soften again under heat. Films formed of rubber-paraffin wax compositions or papers coated with such compositions are likewise heat-sealing.

Hot melt coatings: Thermoplastic coatings used as alternative to lacquers or spirit varnishes. These are melted before application, then picked up by a heated roller and transferred to the web. A high gloss varnish is achieved. More important, perhaps, a high moisture resistance and resistance to fats, oils, greases, soaps, abrasion and scuffing are attained.

Impregnation: The process of treating paper or paperboard with a liquid used in hot asphalt treatments, in waxing and in a number of other cases.

Lacquered glassines: Glassine papers are highly grease resistant and hence are utilized for a vast number of packaging purposes, particularly for the preservation of goods, tobacco and chemicals. The application of lacquers to glassine makes them practically impervious to air and vapors and thus serves to extend their utility.

Lacquers: A broad group of materials used for coating papers to achieve decorative effects and glossy appearance and to enhance the color values of inks. They are also used to achieve protective effects such as

scuff-proofness, moisture-vapor resistance etc. Lacquers may be applied to papers before or after many such processes as printing. Lacquers consist of solutions of natural or synthetic resins such as cellulose nitrate, cellulose acetate, methyl cellulose or benzyl cellulose in an organic solvent. To this may be added modifying agents such as plasticizers, resins, waxes, or pigments. The solvent evaporates, leaving the dissolved material as a shiny, continuous protective film on the surface of the treated paper.

Pyroxylin coated papers: Papers which have been coated with pyroxylin lacquers. Widely used for box coverings, labels, food wrappers, tobacco wraps, etc. Also fabricated in board stock weights for use in cartons and in displays. Pyroxylin coated papers are made in gold, silver, copper and in a wide range of tinted metallic finishes. Coating is water-repellent and has a high deep gloss finish.

Rubber derivative coatings: These are made for high grade, low protein content rubbers. This rubber is put into solution in a solvent, forming a heavy viscous non-drying cement. The rubber cement is placed into jacketed reactor and is heated for a period of time with a catalyst. By controlling the heat and time, the physical characteristics of the product can be accurately controlled. The result of the reaction is a family of resins of differing viscosities. These resins are recovered from the solvent as a finely divided powder which is vacuum dried. The powder is then dissolved into a solvent and this is deposited as a film on the paper to be treated. The film is glossy, non-tacky, heat-sealing and clearly transparent.

A wide range of materials is made by this method to achieve varying degrees of moisture-vaporproofness or other desired qualities. Coatings have a good anchorage to the paper. They can be heat-sealed at temperatures of from 275 to 350 deg. They can be prepared to give a wide range of gloss finishes. Thus when applied over labels, they are made with a very high gloss. When coating parchment paper, kraft paper and similar



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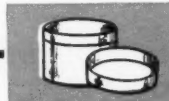
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materials, the degree of gloss is not as important as other qualities more desirable. Coatings have a low permeability to gas and particularly to air and are highly moisture-vapor resistant.

Mixed with waxes, these rubber derivative materials are used as hot melt coatings. The addition of rubber derivatives to paraffin wax substantially increases the toughness of the wax. It improves its gloss and materially strengthens the heat seal obtained when films of these mixtures are compared with films of the wax alone.

Spirit varnishes: These are alcohol solutions usually of manila gum which dry by the evaporation of the solvent. They give a clean smooth finish over most grades of paper and are usually run over print. Care must be exercised not to use inks soluble in alcohol on sheets to be spirit varnished. (See also varnishes.)

Varnishes: Varnishes are solutions of resins (copal, shellac, etc.) in a solvent such as turpentine or linseed oil. Usually a drier is also included. After evaporation of the volatile elements in the solution and the oxidation of the non-volatile elements, a thin shiny layer of the dissolved material remains. Varnishes are often utilized as an after-print coating and are then called overprint varnishes.

Vinyl resins: Vinyl resins or co-polymer vinyls are formed by the simultaneous co-polymerization of vinyl chloride and vinyl acetate. The resultant product is a tough, colorless, transparent resin soluble in a number of solvents. Vinyl resins are applied by three principal methods. The first is the solution coating method in which a roll or doctor blade is used to control the application of the film. In such cases, it is necessary to

"force dry" or bake the coated stock in order to rid the film of the last trace of the solvents, since copolymer vinyl resins are not heat hardening. For film thicknesses such as are used in connection with the packaging industry, a few minutes of such baking at approximately 250° F. is usually sufficient.

Calender coating of vinyl resins is accomplished by working the plastic mass into a thin film over heated rolls, then calendering this film continuously on to paper which is fed through the machine at the same rate as the film is formed. Vinyl calender coated papers are widely used as liner material in closures for food products. Solution coated papers seem to be better fitted for the wrapping grades, since a thinner coat can be applied by the solution method. Aluminum foils, such as are used for cheese wrappers, are frequently treated with a thin clear coat of co-polymer vinyl.

The thermoplastic qualities of co-polymer vinyl resins suit them particularly for cases where heat-sealing is required. Solution coating is used on labels to achieve resistance to water, alcohol, alkali or grease.

The third coating method has but recently reached the commercial stage and involves the use of vinyl emulsions. The method is particularly desirable for coating the surface of porous materials with a minimum consumption of resin per unit of surface covered. This is possible because the water strikes into the porous surface first and thus prevents penetration of the lacquer. The method seems to have particular application for use in conjunction with pulp containers.

Wax-rubber coatings: Wax is frequently mixed with rubber derived materials to form moisture-vapor resistant coatings of the hot melt type.

Heat Sealing

by F. S. Leinbach

WELL-known organic materials, by themselves or in specially modified blends, have little tendency to be sticky at ordinary temperatures, but they reach a molten or "fusing" state at reasonably high temperatures (from 130° to 300° F). Applied as coatings to sheet or film materials, or cast into films themselves, these materials enable two or more layers of the coated sheet or film in close contact, to adhere to one another upon the application of sufficient heat to raise the coating or film to its melting or fusing temperature. The process of effecting this union is known as "heat sealing." Originally describing a method of closure, the term has been extended to many techniques involving adhesion through the use of sufficient heat to soften, and sufficient pressure to cause close contact with, "heat-sealable" material. Examples of this broader meaning are found in "heat-sealed" envelope windows, package labels, identifications etc. Analysis of heat sealing indicates three general phases of

the problem: materials, method of application, and technique.

Materials

The oldest, and still the most widely used heat-sealing material—the "pack horse" of the business—is paraffin wax. Paraffin has the sharply defined melting point characteristic of crystalline materials. However, there are so many different paraffin waxes that the best that can be done in commercial refining is to segregate and to group those whose melting points are close together, and thus there results 133° to 135° melting wax, 138° to 140° melting wax, etc. Nevertheless, among heat-sealing materials, such close melting ranges are quite sharp. This means that in paraffin a material is available which is not particularly "tacky" at ordinary temperatures and therefore does not have too great a tendency to



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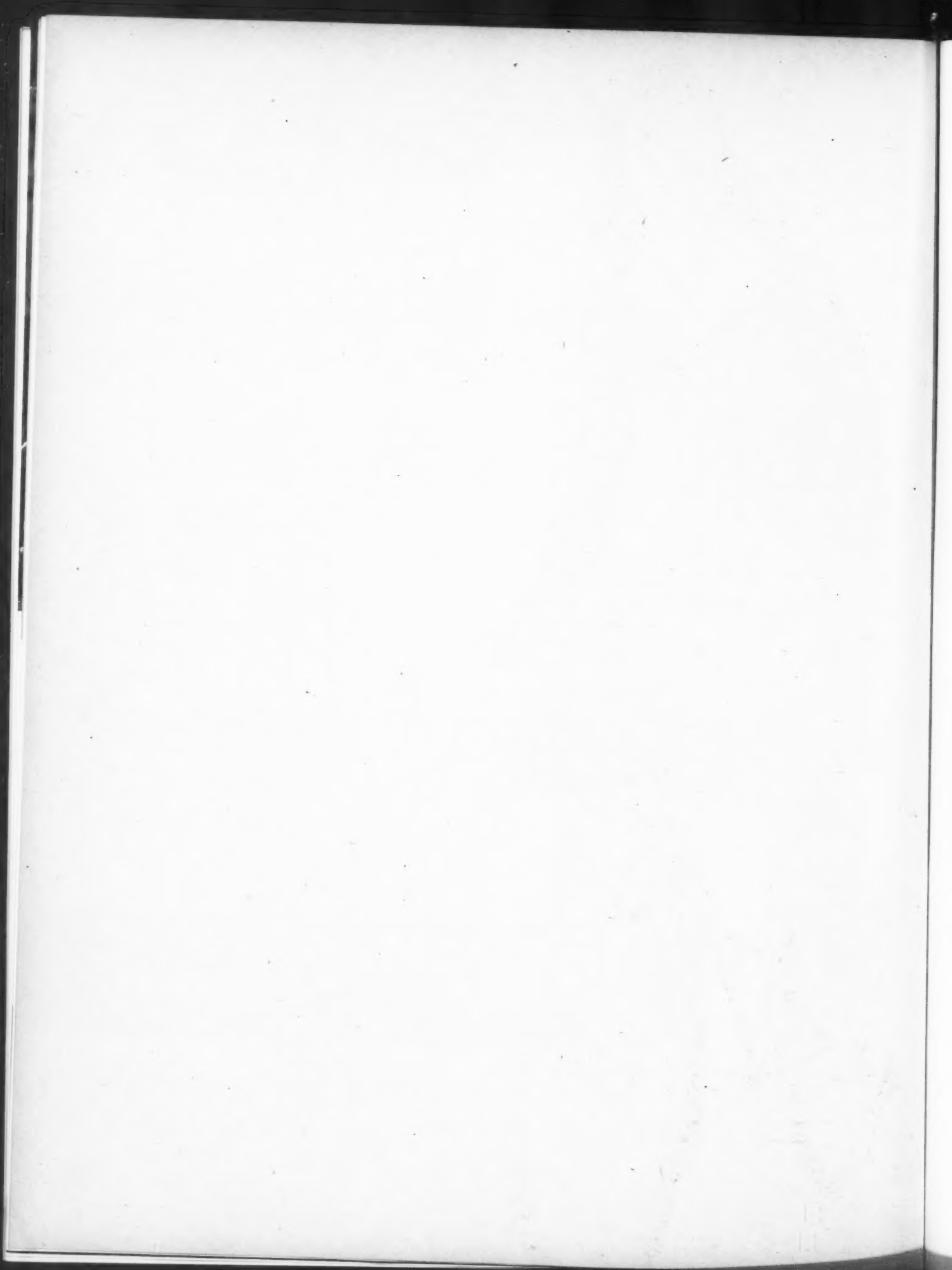
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stick to itself (i.e., block), but which, at elevated temperatures, is molten and will fuse.

A film of paraffin wax has virtually no tensile strength, therefore the functional film of this material must be cast upon some carrier which has such tensile strength. The most common carrier, of course, is paper. As with all heat-sealing coatings, wax requires that it have sufficient thickness as a virtually continuous coating before there is enough of the material to effect a seal. Thus, in waxed papers, the amount of wax necessary for maximum seal varies with the absorbency or surface smoothness (among other qualities) of the base papers. Smooth surfaced glassine may require a minimum of 5 lbs. of wax per 25-lb. ream of paper, while more absorbent, less smoothly surfaced sulphite may require 15 lbs. per 25-lb. ream. Needless to say, both types of paper have advantages indicating particular uses for each. It should be noted that neither the cohesion of paraffin to itself nor the adhesion of paraffin to its paper base is very great, as any one can testify who has opened the end of a loaf of bread wrapped in waxed paper, though obviously the "seal strength" is adequate for many, many purposes.

Wax can be toughened, its cohesion and adhesion increased, by modifying it with other materials. Formerly, wax, rubber and certain resins were compounded, advantageously producing excellent seal strength. These coatings are characterized, among other qualities, by being quite sticky or "tacky" when heated to comparatively low temperatures.

Next to paraffin wax, the materials most widely used in heat sealing are nitrocellulose blends used as coatings on paper or film carriers. Nitrocellulose alone is not heat sealing, for it decomposes under heat before it melts or fuses. There are, however, materials which soften it (plasticizers), and resins that blend with it to lend excellent cohesion of the blend to itself, when fused, and excellent adhesion of the blend to the carrier or base material upon which it is coated. The job of the lacquer formulator is to find that happy but very elusive blend in which the hardness of the nitrocellulose keeps the coating from sticking to itself (blocking) at ordinary temperatures, in which the cohesion and adhesion of the resin make a strong seal, and in which the plasticizer so effects the "softening range" of the mixture that it fuses before the temperature becomes so high that the nitrocellulose and resin decompose or the carrier material becomes seriously dried out or otherwise damaged. It should be noted that these blends do not melt, as does paraffin, but when hot become sufficiently soft and tacky to fuse. The outstanding example of this type of heat-sealing material is heat-sealing cellophane, in which the nitrocellulose coating is applied to a film of regenerated cellulose, which, without the coating, would have to be sealed with a glue. There are, as is well known, other functional advantages of the coating besides heat sealing, just as there are in paraffin coatings.

The ability to fuse when hot, but not to block at ordinary temperatures, is defined by the temperature at which varying degrees of softness and tackiness are reached, generally described as the "softening range."

There are a number of materials which have "film-forming" characteristics, just as nitrocellulose has, but which also have a softening range enabling excellent heat-sealing coatings with little needed formulation for heat sealing alone. Outstanding examples of this are ethyl cellulose, cellulose acetate, the "cyclicized" rubber compounds and rubber hydrochloride which were finding increased use prior to Pearl Harbor, and the vinyl polymers. Some of these materials have sufficient tensile strength to be cast into self-supporting films, as is the case with cellulose acetate, ethyl cellulose, rubber hydrochloride and others. This field has been increased, though the full range and application of these materials will only become apparent after the war. Among these are the vinyl polymers, vinylidene chloride polymers, mixed cellulose ethers, and many others that are waiting for the working opportunities of America at Peace. Some of these materials have a softening range that enables their blends to melt and become fluid at reasonable temperatures (250-300° F.). This means that they can be applied as coatings from a melt, like paraffin, rather than from solution as nitrocellulose lacquers are applied. Thus the term "hot melt" coatings.

It should be noted that in waxed papers, nitrocellulose-coated film or paper, or paper or film coated with any of the other coatings, the coating fuses and holds the carrier material together. The strength of the seal, therefore, depends upon the cohesion of the coating as well as upon its adhesion to the carrier film. Some seals are not particularly tight, while some are so tight that the carrier is torn before the seal is broken. This latter measure of seal strength depends upon the strength of the carrier as well as upon the coating material. A weak paper or film may remain intact because the heat seal is weak, whereas a strong paper or film may fail on separation because the heat is so very strong.

It also should be noted that in the case of films made entirely from heat-sealable materials (rubber hydrochloride, vinyl polymers, cellulose acetate, ethyl cellulose, vinylidene chloride polymers, etc.), when layers of the film fuse, the juncture is made entirely of the fusing material, giving the effect of an uninterrupted, single piece of film. In such instances the seal has virtually the strength of the material itself, and, package-protection wise, there are other advantages.

Method of application

Obviously, any device like heat sealing finds many uses, and there will be no attempt made here to list them in detail, other than to point out the fact that heat-sealing materials are applied in four general methods: (1) as a self-supporting film, (2) as an over-all coating on a carrier sheet or film, (3) applied in spot or strip only to those areas of a sheet or film that must be in contact in order to effect the heat-sealed closure (as around the mouth of a bag) and, (4) applied to those areas to be sealed as the package is in the process of formation (as on the end flaps of a wrap just before they are folded and sealed in place).



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In the case of the self-supporting film or the over-all coating, other functional properties of the film or coating are extremely important, such as moisture-vaporproofness. It is essential that the softening range of the film or coating be such that the material shall not "block" easily under ordinary handling. Advantage of this method of use of heat-sealing material is apparent in the fact that whenever any two areas, without regard to position along the web, are put in contact and heated, a seal can be effected. Thus, this method of use is the most widespread, enabling the formation of wraps, bags, and packages and package adjuncts of varied description.

There are many packaging materials having most desirable qualities, but lacking the ability to heat seal, such as vegetable parchment with its greaseproofness, laminated glassine with its greaseproofness and moisture-vaporproofness, and uncoated foil with its many excellent protective qualities. The effectiveness and usefulness of these materials have been extended by using heat-sealing material "spotted" on only those areas which must be in contact when the seal is made. An example of this use is found in the bags of various descriptions which have an imprint of heat-sealing material around the inside of their top edges. Besides rendering more effective function of the bag material upon closure, the heat seal makes an easy, simple and quick means of mechanical closure.

Another example of this imprint method of use of heat-sealing material is in the web materials imprinted so that when properly spotted around the package, all those areas required to be in contact will have heat-sealing material on them. The advantage of this imprint method, of course, lies in the fact that heat-sealing materials which produce strong seals are not cheap, neither are the methods of their application. This method, therefore, is an economical use of heat-sealing material. It is indicated, though, only when the functional properties required by the product reside in the carrier, but when that carrier is not heat sealing. It also presupposes either that the spot application is in a definite location with respect to the package (as in the bags above mentioned) or that the machinery handling an imprinted web be equipped to register the position of the imprinted sealing areas accurately.

The method of use in which the sealing material is applied as the package is formed is closely akin to the preceding method, differing only in the relative time of application. Certain types of equipment, for instance, are able to apply sealing compounds to the longitudinal seams, and to the end folds of foil or paper wraps as they are being placed about the package they are to protect. This method has an added advantage in being able to use heat-sealing formulations without the usual limits on softening range, for since there is no coated or film material to be handled, blocking in storage is not a problem, and the formulator of these compounds needs concentrate only upon seal strength and functional efficiency. The effectiveness with which two or more layers of a particular heat-sealing material may be made to seal together depends upon three factors, viz.: the *temperature*

used to furnish the heat, the *pressure* with which the layers are held in contact, and the *time* during which the hot contact is maintained. Each of these factors varies in relation to the other two.

As indicated above, a heat-sealable material is heat sealing because there is some temperature at which it either melts or becomes fusible. The factor of temperature in heat sealing, therefore, is determined by the temperature at which fusion of the particular material can be accomplished. But it should be noted that if a material fuses at 200° F. the sealing mechanism furnishing the heat may have to be much hotter than that, for it must drive enough heat *through* the intervening layers of sheet or film to raise the two surfaces in contact to the fusing temperature. How much hotter it must be depends entirely upon the pressure with which the contact is maintained, and particularly upon the time that is allowed for the heat to transfer. Furthermore, surface temperature of the sealing mechanism is only an indicator—the amount of heat its heater can furnish is the real determining element, because it must have sufficient capacity (wattage, in the case of electric heaters) to transfer heat enough to make seal after seal and still maintain the temperature differential required to cause the heat transfer capable of raising the inner surfaces to their fusing temperature. For the surface of a sealer to be quite hot at the start of a run is of no particular value. The heater must be strong enough to maintain the proper temperature throughout the run. It would be hard to over-emphasize this.

Pressure of contact is important because under close contact the heat will transfer more uniformly, more thoroughly, and more quickly, for the seal will be stronger with every point of the sealing area in close contact rather than apart in spots. The temperature at which most heat-sealable materials will fuse generally decreases, within limits, with an increase of pressure. As is well known, some of the softer ones will seal at ordinary temperatures under sufficient pressure. Increased pressure, therefore, aids the ease, strength and thoroughness of a seal unless some extraneous factor, such as rupture of the carrier film, is introduced.

Time is a very important factor in heat-sealing technique, and, as indicated above, is closely related to temperature. At any given temperature and pressure enough time must elapse for sufficient heat to penetrate the intervening layers and cause fusion of the sealing surfaces. Increased temperature (properly caused by sufficient heat supply) and increased pressure will require less time.

Limits of operation

Regarding the time-temperature-pressure relationship, it is most important to note that there are limits affecting each of the three factors. If the heat supply is increased, at a given pressure the time can be decreased, but this relationship reaches a limit two ways. The first limit occurs when the time is so short that the sealing mechanism must become so hot that it burns the outer plies of the seal, yet the inner sealing surfaces are never brought to sealing temperature. This is one reason why certain

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materials are found to have a limit of operating speed regardless of heat supply in the sealing mechanism, for as the speed of sealing of the mechanism is increased, the time factor is decreased. This is fairly common, and is most easily noted on fibrous base materials. The situation can be alleviated if the sealing or wrapping mechanism is equipped to apply to the sealing areas small amounts of a solvent for the heat-sealing material, which, under that heat which does reach the fusing surfaces, softens the coatings, enables them to fuse, and then evaporates under whatever heat is there or during subsequent time. Such aids to sealing are known as "solvent activators" and their composition must vary according to the composition of the heat-sealing materials they activate. They are so effective that their widest use is in enabling heat seal of materials ordinarily not heat sealing, such as the type of cellophane usually used for cigarette pack wrapping.

The second limit on the time portion of the time-temperature-pressure relationship is, as indicated above, the strength of the heat supply. It is most important to realize that the surface temperature of sealers at the start of a run means little—there must be sufficient heat supply to keep furnishing heat to seal after seal without cooling below the supposed, or apparent surface temperature. One fallacy of inexperienced operators is to suppose that because a thermostat on the sealers of a high-speed machine has a marking for 500° F., the mere setting of the device at that figure guarantees that temperature. Under some such instances it has been found that the current merely is allowed to flow all the time, that the heater is not strong enough during the run to hold the temperature above an actual 350° to 400° F., and that as a result the thermostat never gets a chance to control the temperature. Obviously, for effective operation, the time factor must be adjusted (machine slowed down) until it comes into balance with the heat-furnishing ability of the sealing mechanism.

Every heat-sealing material has an optimum sealing range—a spread of temperatures below which an adequate seal is not obtained, and above which the seal is not as tight as it could be made. This sets a limit upon the temperature portion of the time-temperature-pressure relationship. The effect of a solvent activator, used under difficult circumstances, is to broaden the optimum sealing temperature range of the heat-sealing material. A further limit becomes apparent when it is realized that if the outer plies, or the outer portions of plies adjacent to the sealing surfaces, are made so hot that they remain above the sealing or fusing temperature of the heat-sealing material, that material remains soft, the seal is not self-supporting, and may open. Some materials that actually melt, such as paraffin wax and others which fuse at similarly low temperatures, always require a definite "chill," or cooling-off while the component plies of the seal are held in place. An example of this is found in the "take-away" belts on a bread wrapping machine handling waxed paper. Without the chance to solidify in position, the seals would all come open. Materials which fuse at a higher temperature do not need that type

of "chill," such as heat-sealing cellophane, but they must not be made so hot that their heat cannot quickly be transmitted to surrounding areas, or else the seal will be less effective. Self-supporting heat-sealing films, such as rubber hydrochloride, should not be made too hot, for the material will be pressed out too thin and what otherwise would be a weld of the entire material as strong as the film itself, becomes the weak point of the package.

The handling of the time-temperature-pressure relationship is a technique which must be worked out in practice with a given heat-sealing material on a given sealing mechanism doing a particular job. It is seldom possible for even the most well-informed manufacturer to tell the user *exactly* what temperature, for instance, to use with his material, because this will vary according to the job the user wants done, as well as according to his equipment.

Mechanics of heat sealing

The mechanics of causing heat-seal generally are effected through contact between the material to be sealed and a close-pressing, heated area of metal. Translated into moving machinery, this is done through three types of movement: reciprocal, rotary or sliding.

The simplest form is reciprocal motion, and is exemplified in the common "crimp" sealer, wherein two heated metal plates are brought together, pressing the areas to be sealed between them. The simplest are manually operated, with time and pressure, and sometimes temperature left to the judgment of the experienced operator. These are improved with thermostatic heat control; in some machines complete control is given for the whole time-temperature-pressure relationship by thermostatic control of temperature, and by actuating the sealing jaws with an electric motor through a drive having adjustments to control time and pressure. Various types of configuration of the sealer surfaces are used by the different manufacturers.

Reciprocal sealing motion is being used increasingly in wrapper and package forming equipment. Certain machines placing liners in cartons make ingenious use of reciprocally moving sealers that travel with the liner forming device.

Reciprocal motion also is used in various types of machines making bags on which all seams and seals are heat-sealed, and is not only advantageous, but one of the two forms of sealing motion to which certain heat-sealing materials are limited, as will be brought out later.

Rotary motion, as the term implies, effects a heat seal by having the layers to be sealed pass beneath a heated roller, or between two heated rollers. Here the time factor of the time-temperature-pressure relationship has great effect upon the temperature factor, for the effective sealer area is only the line of tangency (actually a small area) between the surface of the wheel and the plane supporting the material to be sealed, or between the two sealing wheels. If the material to be sealed moves by quickly the time allowed for heat transfer becomes very short. This situation is sometimes assisted through the use of "pre-heaters" which warm the areas to be



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SERVICE**

We are a central source for all kinds of papers and paper converting, such as coating, printing, embossing, laminating and fabricating. Our service also includes a full line of fancy and decorative papers for coverings and greeting cards, also papers with protective coatings.

How the service works:

As a coordinating office for the activities of many paper mills and converters, we are in the position of allocating your problem to the source best able to solve it. We put development brains to work on your packaging needs, and assign the workable solution to the mill best able to produce the paper you require.

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Where special coatings and laminations are called for, we have reliable development and production sources for these types of work, as well. Our service has already developed many satisfactory grease-proof, moisture-proof, scuff-proofed and other protective papers, coatings and laminations.

If you have a packaging problem that requires paper write us.

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sealed prior to their entering the sealer contact. Solvent activators find only limited use, and then only under favorable conditions, with this type of motion. If they don't actually and obviously help, they are worse than if not used at all. This is because under this type of motion the outside of the webs to be sealed sometimes tend to adhere to the wheel and the seal, still soft under the influence of the activator, gets pulled apart as fast as it is made, and never has a chance to "set up" in position. This has been assisted through the use of pressure belts that hold the seal together throughout all the phases of the operation. Actually, this type of seal failure sometimes occurs without the presence of an activator if the material being sealed has as strong tendency to adhere to the wheel as it has to cohere with itself. Examples of this are found, under certain conditions, in some papers having both sides lacquered and in some machine operations (rather than hand operations) with rubber hydrochloride films. In the case of materials suffering these difficulties, it is not to be assumed that the machine is a failure nor that the material is inadequate. Rather the functional qualities or the economy of the heat-sealing material, or the special advantages of the equipment, should be considered, and the cost of variations either of changed operation to balance the time-temperature-pressure relationship, or of minor mechanical adaptations of the equipment, weighed in the light of accrued advantages in use.

Sliding motion is the most widely used method of heat sealing, being characteristic of almost every wrapping machine that uses heat seal for closure. In the case of the wrapping machine, it is obvious, from a simple analysis of the wrap formation, that in order to seal all avenues of entry to or from the package, the wrap must be heat sealing on both its surfaces. This means that heat-sealing material will come into contact with the sealing plates along which the wrap slides as the seal is made. Since a fusible material on being heated first becomes "tacky," then reaches its fusing point, there is a tendency for some heat-sealing materials to stick to the sealing plates when there is insufficient heat supply to maintain the proper sealer temperature. There also are certain materials, such as the coatings and films derived from rubber, which cannot be made to seal with sliding motion. In the case of the rubber derivative coatings, none has yet been formulated which will retain its functional qualities, to the best knowledge of the writer, yet slip across a sealer. The coatings, even up to the point of decomposition, still remain so tacky that they will stick to the sealer so tightly that the wrap, after a very few packages are run, is torn from the package. The case of the rubber derivative film is much the same. Again, the question is not to condemn the material or the equipment. If there is too little heat supply and a two-side lacquered material begins to stick to the sealers, it generally is a simple matter to increase the heat supply and to secure good operation.

With this type of motion, as with the other types discussed, the time-temperature-pressure relationship is paramount, and, as with the other type, the temperature

factor must always be considered as a problem of the supply, and rate of heat transfer within the time available for that transfer.

Much work has been done on the kind of material to be used for the sealers. Copper has been found desirable because its thermal conductivity allows more uniform heat distribution over its entire area, and because it resists chemical reaction with the resins used in heat-sealing materials, which often have a high acid number. Brass, easily formed into parts, is widely used, and has good thermal conductivity, although it is not so resistant to corrosion as copper. Stainless steel has been widely and effectively used, and has given long, satisfactory service. Cast iron is proposed by some engineers, but has not found widespread application, probably due to its sometimes porous material structure and lower thermal conductivity.

As mentioned under the section of application, there has been no attempt to discuss the many ways of taking advantage of heat sealing. As a means of mechanical closure it is simple, direct, and can be very sure. It can contribute tremendously to the functional abilities of packaging material because it is the link that completes the chain of protective qualities in a good package, closing the last entry or exit for moisture-vapor, water, grease, contaminating aromas, etc., as needed. The actual form of package made effective through heat sealed closure may be chosen from many, as the marketing requirements, the shape, the size or the physical or chemical properties of the product dictate. Bags made from sheet or film with its entire surface capable of heat-sealing, or made with an imprint enabling heat-seal of just the top and/or the bottom, packets made by sealing two sheets of film or paper together around their four edges, pouches made the same way, or by folding a sheet back upon itself in sizes ranging from quite small to very large liners, placed in cartons either as pre-formed bags or as bags formed with heat seals right on the package-forming machine, wraps, plain, printed or transparent, with or without inner supporting carton, all are forms of packages available through heat sealing. Machines ranging from the simplest inexpensive foot-power crimper to the most complicated automatic package forming, filling and sealing set-up are available in wide variety from reputable and very capable engineering firms. Materials ranging from the most ordinary waxed sulphite, through the glassines and the lacquered or hot-melt coated papers, through the cellophanes with their heat-sealing coatings and the films that are entirely thermoplastic, the specially coated foils, to complex lamination of combinations of these materials with themselves or even more complex laminations of various of the materials so that each may lend its qualities to a combined job on packaging, all are available for heat-sealing work. Each requires its own terms of handling, though many are similar, and each reaches its best use through cooperation between supplier and user in learning the optimum conditions under which the needed qualities of the material are available with smoothest operation to do the packaging job that has to be done.

Decorative Packaging in Wartime

THERE is sound psychology behind the public's continued demand for decorative wrappings in spite of the wartime emergency. It is the urge to hang onto the niceties of the peacetime to which we hope soon to return. If at all possible, these demands must be met both for the packaging gifts and for the enhancement of the little luxuries which present economies permit.

Of course, many familiar types of decorative materials are definitely "out" for the duration. Manufacture has been restricted or allocated, and pre-war stocks have shrunk almost to disappearance. But as long as colored inks are available, as long as paper can be had for the purpose—and existing printing and embossing equipment lasts—decorative wrapping material of a sort will be produced. This applies not only to paper but to sealing and tying materials also.

Cellophane, foils, metallic inks and protective wrappings such as glassines, greaseproof and vegetable parchments, often used largely for decoration, have been rigidly restricted under various WPB orders. Most of these materials are still being made, but their use is permitted only for protective packaging of food, health and military or lend-lease products. This leaves little available for uses which have hitherto accounted for large volume of consumption.

The reason behind it all is the super-essentiality of the available labor, for skilled hands are needed to make good decorative wrapping materials, and these hands

have been called to the now more vital duties of manufacturing and using military goods. The output of the remaining workers must be spread as thin as possible and used only to supply the most urgent civilian needs.

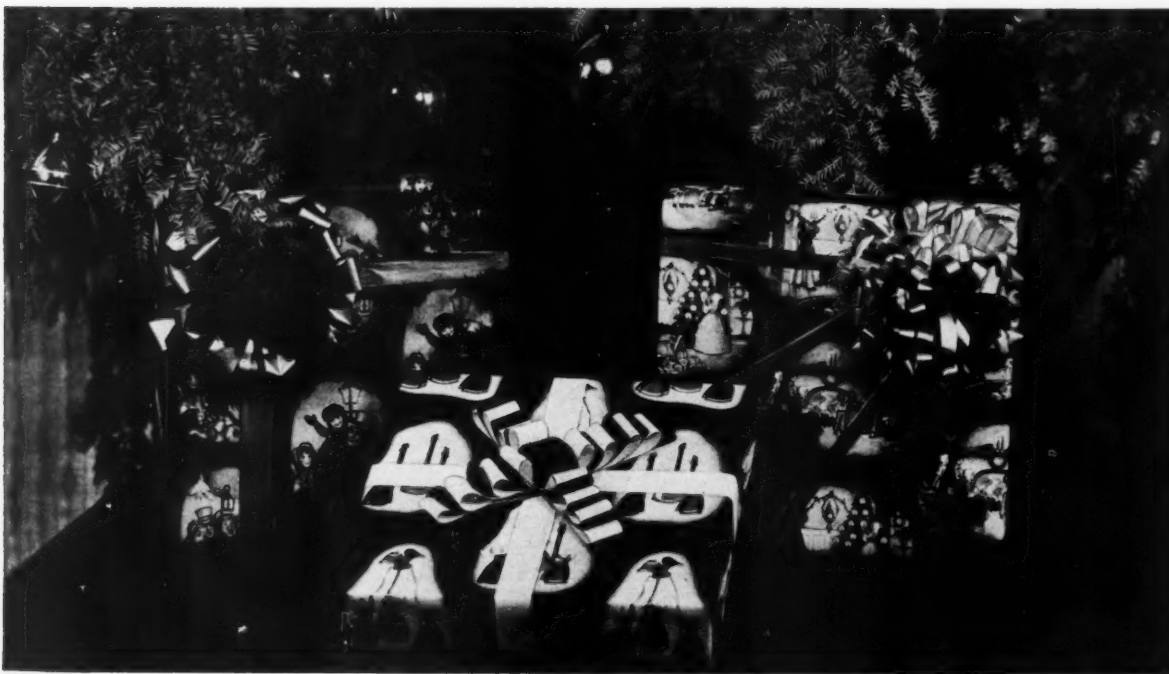
But America is still color-conscious and wants nice paper and string in which to wrap its gifts. Even a low-priced item, attractively packaged, is a morale-builder in its own right, and the urge to give and to use materials in this fashion will continue, at least until things get much tougher than anyone expects they will.

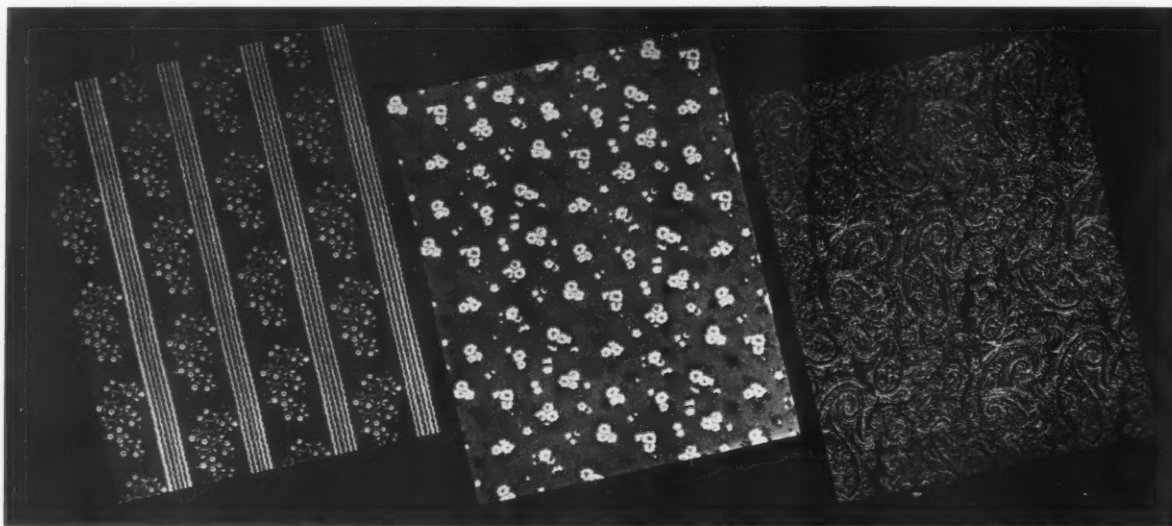
What the trade is facing

In addition to the labor situation, the decorative wrappings trade faces some other factors that exert an inevitable influence: Facilities vital to paper making—such as machinery, pulpwood and coating materials—are short in supply and are irreplaceable. However, there is a smaller volume of civilian goods to require fancy wrapping, for other fields have been similarly restricted in production. Normally this would be catastrophic, but in view of the over-all picture, many see it as a blessing in a thin disguise.

All of this has resulted in the development of a new philosophy in the field and, barring a ruinously protracted war, the decorative paper manufacturers and distributors will come through in good shape. To be sure, they probably will have shed a good deal of nonsense and many frills, and have a better idea of the essentials of

Will decorative wrapping disappear entirely? To some extent, yes, but on the whole, the American public still loves gifts and wants to continue to wrap them attractively.





Manufacturers intend to continue producing these decorative wrappings just as long as possible.

their business. Some changes have already come about in the way of uniform selling procedures and business practices: The small one-time accommodation order is not being sought after—in fact is often refused; the unlimited variety of lines has been restricted, and competitive duplication may possibly be controlled by agreement.

The labor situation

Because many paper mills are located in defense plant areas, they find themselves competing for good workmen with both their neighbor plants and the draft boards. Little can be done about that, either, for the wage stabilization laws prevent competitive gratuitous increases and deferment is difficult to obtain. Mill operators approaching the U. S. employment offices are bluntly told that manufacture of bombs is more important than fancy paper. The result is that the labor left available for making fancy paper is far from the better grade—is neither skilled nor likely to become so. It is reported that common practice in many mills is for plant operators to come in early, "get out the mail" and then climb into a pair of overalls and go into the plant to operate a coating machine or some other piece of equipment.

In the machinery situation, mills are not much better off. Metal rollers for embossing, printing or calendering are scarce. They wear out and frequently do not rate any priority standing for replacement in the opinion of those who have the last word.

As existing production equipment wears out, therefore, familiar staple designs will be entirely consumed and there will be no new ones to replace them. Too, the general supply of basic paper is intimately tied up with the labor situation—reaching back into the forest where the woodsman cuts (or once did) the tree which eventually became paper. The transportation situation likewise is a factor, as is every other step down to the finished product. Even coatings—wholly restricted for

some of the synthetic materials—are further restricted when their base is casein, a dairy product, for here the paper maker finds himself competing with the cheese maker and the lend-lease and the army provisioner. And paper frequently comes out second best.

Metallic papers have been removed from the sample books for all intents and purposes. The limited pre-war stocks are so depleted that they are almost no business factor. Pyroxylin finishes have likewise been dropped from the lines, due to government restrictions and the need for basic materials elsewhere, but velours which were off for some time, are on their way back. This is due to the fact that chemists have found a substitute for the critical ingredient in the adhesive which is vital to the manufacture of velours. It is worth noting that, while in World War I a shortage of dyes affected the availability of decorative papers, this problem has been licked now; but today there are no skilled workmen who can use the American-made dyes that are available.

What of the future?

With respect to the 1943 holiday season and the anticipated demand for gift wrappings, the trade seems to feel that the lines will be very streamlined and limited. Perhaps there may be only three or four grades of paper available, and a similarly curtailed situation may exist with respect to designs. One observer foresaw only white, cream and gray in a few embossed or printed arrangements; another house is offering a very limited number of last year's styles, mostly along staid conservative lines. There may be only remnants left of the holly-berry and wreath papers which once abounded, but emphasis may be placed on decors and motifs which could serve for any gift-wrapping occasion—the theme of the season then would be set by the gay tie to be used. Ornamental string and ribbon will doubtless continue as long as they do not employ critical materials. Tinsel string, however, will not be plentiful if available at all.

Which one is your solution?

Traver has been solving packaging problems since before the turn of the century. Here are the Traver products that are helping many package users meet today's particular requirements. We will welcome an opportunity to help you find the solution to your problem.

CELLOPHANE BAGS. Plain or printed. Outstanding is the *Tite-Seal* cellophane bag for army rations, dehydrated and frozen foods.

CELLOPHANE LINERS. Carton liners for packaging a wide variety of foods formerly packaged in cans and glass jars.

METAL-LINED BAGS. Combination metal, cellophane and paper bags which offer unusual strength and provide complete protection against moisture, light and vapors.

CELLOPHANE. Multi-color printed, in sheet or roll form.

GLASSINE. Multi-color printed, in sheet or roll form, for candy and food packaging.

TRACO-PAKS. A combination of cellophane and greaseproof board for packaging meat products.

TRAYERWRAP. For packaging lingerie and men's undergarments, drinking cups, candy and tobacco.

TRAVERSHEEN. Wrappers, bands and bags for packaging lingerie and men's undergarments, and for holiday wrappings.

LOXTITE. Partitions for packaging candy, cookies, beverages, eggs and all fragile commodities. Used extensively today for packing small fuses and other implements of war.

DIVIDERS. Trays and boats for candy boxes.

Let **TRAYER** Help Solve Today's Packaging Problems

TRAYER TITE-SEAL Cellophane Liners for packing frozen and dehydrated foods

The bag-in-a-box package is the answer to the current restrictions on metal containers—one that reduces shipping weight, saves space in transit and storage, and speeds freezing. With Trayer Cellophane Liners you get this truly modern package in its finest form. They are completely machine-made, which insures absolute uniformity and permits greater production speed to meet your emergency requirements quickly.

THE TRAYER TITE-SEAL

This is the simple reason why Trayer cellophane liners offer far greater strength and durability. Note how one sheet overlaps the other at the side seams. These three thicknesses are sealed together. The inner seal opens to provide for expansion of contents during freezing—eliminates the danger of breaking or cracking the film. The ultimate seal is not disturbed, and is much stronger than the conventional side seam because weight of contents does not rest directly upon it.



Overlapping side seam is sealed together.



Inner seal opens during freezing.



Weight of contents doesn't rest on final seal.

SINGLE OR DUPLEX

Trayer Cellophane Liners are available in either single or duplex style. Both are made with the Trayer TITE-SEAL. For greater ease in filling, the duplex sheets are welded together vertically as shown in sketch. This increases rigidity, and eliminates the danger of inserting liner incorrectly in carton, or spilling contents between sheets.



TITE-SEAL FOR ARMY RATIONS

Smaller size bags, made with the Trayer TITE-SEAL, are also available. These are being used for packing army rations, and for all similar applications where maximum strength is essential.

Write for Full Information

TRAYER CORPORATION, 358-368 West Ontario Street, Chicago, Illinois
Patents Applied For

It is altogether possible that many of the most discriminating outlets will be using "plain-ish" papers with fancy string—and liking it. Some of the new modified lines are extremely attractive. One rayon ribbon has been ingeniously decorated with rayon flock, both in contrasting and matching colors, to make a most interesting tie. Commercial packaging of holiday and luxury goods will doubtless be strongly affected by this trend, while department stores will undoubtedly follow in the same route in their gift-wrapping departments. Custom-made cotton tapes and binders are entirely possible and offer vast possibilities. Then, too, there are some remnants of cellulose ribbon on hand and as long as the stocks last, these too will be in fashion.

Other restrictions

As long as the foil wrapper must remain in the service of vital production, decorative fields will have to get along without it. Its virtues are legion for sealing in flavor and keeping out moisture and contamination, and most package users are looking forward eagerly to the time when the existing restrictions will be a memory.

Tissue paper is almost the first item coming to mind when the subject of gift wrapping comes up. In its simplest form it adds that "something" to a package that lifts it out of the ordinary—it naturally spells "quality." The best, of course, is the No. 1 white which is a full-bleached tissue made of all-sulphite finish. No. 2 white and Manila are second in appearance but fully as good for protective purposes—packing garments, glassware, etc., which must be unwrapped before being displayed. These types contain about 40 per cent ground wood-pulp which is cheaper than sul-

If fancy paper is not available, gay, decorative ribbons and string, made of non-critical material, will lend verve to plain-paper packages.



phite, and are not as strong or good looking as No. 1. The top grade is excellent for wrapping silverware or metal products which tarnish readily, because it is free of sulphur; generally white No. 1 is used for silver, and kraft No. 1 for hardware and similar non-luxury items. There is also a wide range of colors for No. 1 tissue which can be used most advantageously to give "life" to packaging which might otherwise be on the drab side. Black or brown tissue is frequently used to wrap suede shoes, protecting them from white lint. A waterproof tissue recently developed will be heard from in increasing quantities without a doubt. Shredded tissue either colored, waxed or plain, makes an excellent medium for packing fine glassware, candy novelties and the like.

"Before the war" trends of special departments for gift wrapping are being continued to some degree, but where this service was frequently a part of the store's good-will expense, a charge is now being made. In fact some stores are seriously toying with the idea of abandoning it altogether for the duration, in view of the labor situation. One store manager reported that he had a process for dyeing newspapers and would use it if the supply situation got much worse; but the other considerations are more important.

Box coverings

Of course one of the most important uses of decorative paper is that of covering paper boxes, and this forms the largest field of consumption. What applies to decorative paper as a wrap is just as true for a box covering. The shortages exist and must be met in the same spirit. Whether a box is designed for a utility tool or a jewel, some sort of covering is envisaged when it is designed, and it is not out of place to give the boxmaker some basis of information on which to choose the coverings that still are or may in the future be available.

The following list includes practically all standard kinds, but the point must be emphasized that while certain types are listed, it is no guarantee of availability.

Uncoated box papers: The kind of paper, such as rag, sulphite, kraft, or groundwood, which is to be coated, embossed, etc. This may be antique, natural finish, or super-calendered.

Coated box papers: Prepared by several processes, as follows:

MATT COATED: A casein or clay coated paper made on a brush coater or roll coater, or some type of brushless coating machine.

BRUSH FINISHED: A coated paper whose surface is polished by brushes.

PLATE: A coated paper, finished smooth by cold rolls through pressure in a stack calendering machine. For a very high finish this paper is sometimes subjected to steam before being calendered.

FRICTION GLAZED: A coated paper whose surface is polished by heated rolls in a friction calender, friction being produced by the faster rotary action of the steel polishing roll against the slower cotton roll.

REPLACING RESTRICTED MATERIALS



MIDDLESEX *Friction Glazed Papers*

Manufacturers of products formerly packaged in metal, plastics or containers covered with textiles, leather or other scarce or restricted materials, have saved the day by adopting PAPER BOXES, TUBES and CANS covered with
MIDDLESEX FRICTION GLAZED PAPERS.

These colorful, soil resisting, glazed papers are available from stock in a proven range of popular shades.

Sample sheets are ready for you at all MIDDLESEX offices.



MIDDLESEX PRODUCTS CORPORATION

CAMBRIDGE, MASSACHUSETTS

New York, Chicago, Philadelphia

Manufacturers of Box Covering Papers: Friction Glazed, Plated, Mica, Embossed, Waterproof

MICA: Paper whose coating material consists of ground mica crystals to give it a sparkling, finished appearance.
FLINT: A coated paper whose surface is highly polished by being rubbed across the sheet with flint stones. This process is slow but effective.

WATER-PROOF: A paper coated and then top-surfaced with water-proof material, such as casein or gums; or coated once with heavily sized color; or mixed with water-proofing gums.

WATER-PROOF LACQUERS: Coated papers using pigmented pyroxylin lacquers, which produce an unmottled surface with antique or high-gloss finish.

FLOCK: Paper coated with varnish on the surface of which is shaken or blown finely powdered cotton, wool, rayon or silk; commonly known as *Velours*.

Metallics (now under severe restriction)

Real and simulated metallic effects on all coated papers produced as follows:

Gold, platinum, tints: Produced by grinding bronze (gold), aluminum (silver) and copper, with casein and other gums or with pyroxylin lacquer; paper generally stack calendered to produce smooth and brilliant appearance.

Silver glazed (silver coated): Paper coated with "argentine," a precipitate of tin, which is first dull gray in color, but is polished to a silver finish by a friction calender. "Argentine" finish is now also available in gold and colors, both plain and embossed.

Pyroxylin coated: with lacquers in bright, dull, and pearly effects.

Half fine metallics: Produced by laying patches of a thin copper or aluminum alloy about five inches square on paper that has been coated with an adhesive. The patches are allowed to overlap in order to form a continuous metallic surface and the overlapping edges are brushed to remove any surplus.

Foils: Produced by applying to paper a continuous sheet of metallic foil, usually tin, aluminum, zinc, or their alloys. The foil is bonded to the paper by adhesive.

Fancy papers

Fancy box-covering papers are either embossed and tipped with colored or metallic ink, or printed in designs of one or more colors. They may be decorated in mottled, speckled, streaked or blended effects, or in a definite design in any of several processes, such as wall paper, or other rotary-printing machines; intaglio printing; print or ink embossing; or topping.

KIDDER: Oil-ink surface printing from curved plates locked on a roller form and registering each impression as the paper runs beneath.

WALL PAPER: Water-color surface printing in one or more colors from relief-pattern rollers, one for each color, registered to make the complete design.

ANILINE: Stained or printed or both, with rubber rollers and relief-cut patterns—generally with alcohol-gum colors.

INTAGLIO OR ROTOGRAVURE: Papers printed from a pattern engraved on a copper roller by the photogravure process or by the use of a pattern mill. The ink, which may be water color, aniline, oil, or lacquer, is wiped off the roller by a thin blade set across it which controls the amount of ink by the angle of the blade and the depth of the engraving.

PRINT EMBOSSED: See *Embossed* below.

Embossed papers

By an embossed paper is understood any type having a pattern in relief, produced by any of these processes:

REGULAR: A steel pattern roller and a wet paper-matrix roller are mated together.

FRICTION EMBOSSED: The pattern is pressed against a smooth paper roller run without gears, which permits a slight friction as it makes contact with the pattern. Friction is produced by the use of cold and hot pattern rollers, the latter being bored and piped for steam heating. The combination of pressure and friction causes a deepening of color in the area of the pattern.

PRINT EMBOSSED: Embossing and printing in one operation by the application of ink to the embossing pattern.
TOPPED AND EMBOSSED: A two-toned decoration made by applying color through a roller to the surface of the embossing.

SPANISHED: Color applied to the entire surface of a sheet and then scraped off with a blade, which leaves varied tones of the decorating color depending on the varied depth of the embossed surface.

Embossing designs

COMMON: Patterns in common use by many manufacturers of embossed paper. For instance: Skytogen and certain leather-grains, moire, basket weave, Persian lamb and swirl designs.

EXCLUSIVE: There are several hundred different embossing designs which have been originated or purchased by individual manufacturers who thereby own these designs exclusively. Most manufacturers have exclusive designs of their own and many such designs are protected by registration at the United States Patent Office. The Glazed and Fancy Paper Manufacturers' Association, 902 Union Trust Bldg., Providence, R. I., maintains a registration bureau of these designs for the protection of its members and to answer inquiries from customers and users.

Descriptive terms

The following descriptive terms are commonly connected with box papers, their sales value, or qualities:

FABRIC DESIGNS: Papers printed in designs that imitate various fabrics, commonly known as "fabric prints;" or embossed in imitation of fabrics, such as rep, linen, burlap, and others.

LEATHER-GRAIN: Papers with designs like grains in leather produced by embossing, ink embossing, spanishing, printing, or coating. Common examples are alligator, seal, walrus, caracul, etc.

PROPERTIES	
	Cell P
GENERAL	
Type of material	Regen Cellu
Forms available	Sheet
Clarity	Trans
Thickness Range, in.	.0008
Maximum width, in.	
Area Factor, sq. in. per lb.	12,40
Specific Gravity, Approx- imate	1.4
MECHANICAL	
Tensile Strength, lbs. per sq. in.	
Elongation, per cent	15-2
Bursting Strength (Mullen) lbs. per sq. in.	
Tearing Strength (Elmendorf), Grams	2-10
Folding Endurance	
CHEMICAL	
Water Absorption in 24 hr. immersion test, per cent	Ri
Moisture vapor permeability ¹ Grams/24 hrs./100 sq. in. at 100 deg. F. 95% R.H.	Ri
Permeability to gases	Moist Dry:
Resistance to acids	Poor r strong
Resistance to alkalis	Poor r strong
Resistance to greases and oils	Impe
Resistance to organic solvents	Insol
PERMANENCE	
Resistance to heat (Limiting Temp.) °F.	Begin at
Resistance to cold (Limiting Temp.) °F.	Depend and R.
Resistance to sunlight	No ef
Dimensional change at high R.H., per cent	3-5
Resistance to storage	Deteri
Flammability	Some a
Manufacturers	

PROPERTIES OF FUNCTION

The values reported in this chart were obtained from various sources and are believed to represent acceptable Manufacturers should be consulted for additional special information or for new uses of their materials

CELLULOSE DERIVATIVES					VINYL RESINS		RUBBER BASE P
Cellophane Plain	Cellophane Moistureproof	Cellophane Moistureproof Anchored	Cellulose Acetate	Ethyl Cellulose	Koroseal	Vinylite Coated Paper	Pliofilm
Regenerated Cellulose	Lacquered Regenerated Cellulose	Anchored, Lacquered Regenerated Cellulose	Cellulose Acetate	Ethyl Cellulose	Plasticized polyvinyl chloride	Polyvinyl chloride acetate on sulfite paper	Rubber Hydrochloride
Sheets & Rolls	Sheets & Rolls	Sheets & Rolls	Sheets & Rolls	Continuous lengths	Rolls in 100 to 300 yd. lengths	Rolls up to 750 yd. lengths	Continuous rolls & sheets
Transparent	Transparent	Transparent	Transparent	Transparent	Transparent to opaque	Opaque	Transparent to opaque
.0008-.0015	.0009-.0017	.0009-.0017	.00088-.0015	.0005-.003	.001-.005	Film .002 Paper .003	Normal .0008-.00225 Tensitized .0002-.0004
44	44	44	48	48	36	40	45
12,400-25,400	11,600-21,000	11,600-21,000	14,600-25,000	24,300	19,800		24,000
1.45	1.40-1.55	1.40-1.55	1.25-1.35	1.14	1.40	.27 lb./sq. yd.	1.12-1.15
				9500			Yield 2800-4000 Ultimate 5500-7500
15-25	15-25	18-25	20-35	40-70			Yield 10-20 Ultimate 350-500
				28-33		48-60 for .002" film on .005" paper	
2-10 ¹	2-10 ¹	2-10 ¹	2-5			100-110	
						Poor	10000-1000000 (M.I.T.)
High	High	Low (Water Repellent)	3.5-8.0	0.4	Negligible		0.6-1.5 at 75% R.H.
High	.2-.6	.2-.6	High	Fair	High	High	.5-1.0
Moist: Impermeable Dry: Low	Impermeable ³ Immeasurable ³	Impermeable ³ Immeasurable ³	Impermeable ³ Low ³				6-85 cc. of air/100 sq. in. 100 hr. @ 100° F. & 760 100-1500 cc. of CO ₂ /100 sq. in. 100 hr. @ 100° F. & 760
Poor resistance to strong acids	Poor resistance to strong acids	Poor resistance to strong acids	Poor	Good	Good	Good	Good
Poor resistance to strong alkalis	Poor resistance to strong alkalis	Poor resistance to strong alkalis	Poor	Good	Good	Good	Good
Impermeable	Impermeable	Impermeable	Good	Fair	Good	Good	Good
Insoluble	Insoluble	Insoluble	Soluble, except in hydrocarbons	Soluble	Soluble except in aliphatic hydrocarbons	Attacked by ketones, esters & aromatic & chlorinated hydrocarbons	Soluble in aromatic chlorinated hydrocarbons
Begins to char at 375° F.	Begins to char at 300° F.	Begins to char at 300° F.	150° F.	120° F.	Softens at 200° F. Melts at 250-295° F.	180° F.	160° F.
Depends on type and R.H.	Depends on type and R.H.	Depends on type and R.H.				-40° F.	-50° F.
No effect	No effect	No effect	Good	Fair	No effect	Satisfactory	Fair
5-5	3-5	5-5	Slight	Slight	Practically none		Slight
Deterioration due to age is negligible, provided proper storage conditions are maintained.			Good	Good	No deterioration	Good	Good if kept in dark
Same as newsprint	Same as newsprint	Same as newsprint	Nonflammable	Moderate	Slow burning	Slow burning	Slow burning
E. I. du Pont de Nemours & Co., Inc. Sylvania Industrial Corporation			E. I. du Pont de Nemours & Co. Celanese Celluloid Corp. American Products Mfg. Co. Tennessee Eastman Corp.	Dow Chemical Co. American Products Mfg. Co.	B. F. Goodrich Co.	Carbide & Carbon Chemicals Corp.	Goodyear Tire & Rubber Co., Inc.

OF FUNCTIONAL PACKAGING MATERIALS

ources and are believed to represent acceptable commercial standards. Special grades of some of these materials may be obtained which exceed the information or for new uses of their materials. Because of wartime restrictions, some of the materials listed in the chart may not be available.

NYL RESINS		RUBBER BASE PRODUCTS		WAX BASE PRODUCTS				
	Vynlite Coated Paper	Pliofilm	Cry-O-Vac	Parakote	Paraply	Vegetable Parchment	Wet Strength Paper	Plain Glassine
ly-	Polyvinyl chloride acetate on sulfite paper	Rubber Hydrochloride	Latex film used for frozen foods	Wax & film formers coated on paper & foils	Wax & film formers between papers	Chemically treated paper	Chemically treated paper	Physically treated paper
o s	Rolls up to 750 yd. lengths	Continuous rolls & sheets	Unexpanded bags & expanded bags	Continuous rolls & sheets	Continuous rolls & sheets	Sheets & rolls, many weights & grades	Sheets & rolls	Sheets, continuous rolls, & converted products
o	Opaque	Transparent to opaque	Transparent	Translucent to opaque	Translucent to opaque	Translucent to opaque	Opaque	Near transparency to transparency & opaque
	Film .002 Paper .005	Normal .0008-.00225 Tensitized .0002-.0004	Unexpanded .018-.020 Expanded .0015-.002	.002-.030	.004-.030	.0017-.0055	.0025-.0070	.00075-.003
	40	45	For 1-lb. to 400-lb. packages	36	55	90	88	70
		24,000				6200-21,600	14,400 and up	7200-34,000
	.27 lb./sq. yd.	1.12-1.15	0.935					
		Yield 2800-4000 Ultimate 5500-7500	15,000 @ 40°F. (expanded film)			High wet strength	High wet strength	
		Yield 10-20 Ultimate 350-500	1200					
	48-60 for .002" film on .005" paper					13-65	(Dry, 80% of basis weight Wet, 30-60% of dry test)	10-50
	100-110					14-76	35-50 and up	6-40
	Poor	10000-1000000 (M.I.T.)				High		
		0.6-1.3 at 75% R.H.	Negligible			High, but insoluble	High, but insoluble	Medium
	High	.5-1.0	Very low	.5-1.0	.2-1.0	High	High	High
		6-25 cc. of air/100 sq.in./ 100 hr. @ 100° F. & 750 mm. 100-1500 cc. of CO ₂ /100 sq. in. 100 hr. @ 100° F. & 750 mm.	Permeable to CO ₂ ; negligible to other common gases	Low to high	Low to high	Permeable	Permeable	Low
	Good	Good	Good			Dilute: good	Fair	Moderate
	Good	Good	Good			Dilute: good	Poor	Poor
	Good	Good	Excellent below 50 deg. F.	Fair to good	Fair to good	Fair to excellent; insoluble	Poor	Good
in	Attacked by ketones, esters & aromatic & chlorinated hydrocarbons	Soluble in aromatic & chlorinated hydro- carbons	Soluble except in alcohols, ketones and ethers	Soluble in some aro- matic & aliphatic hydrocarbons	Soluble in some aro- matic & aliphatic hydrocarbons		Absorbs	Good
to F.	180°F.	160° F.	Heat shrinks expanded bag to size of package			200° F. dry; any temp. wet	200° F. dry; any temp. wet	150 to 240° F.
	-40° F.	-50° F.	-50° F.				Good	-20° F.
	Satisfactory	Fair				Good	Good	Good
ne		Slight	Negligible			Expands, stretches	Considerably less than ordinary paper	Slight
ion	Good	Good if kept in dark	Excellent at 40°F. and below			Good	Good	Good
	Slow burning	Slow burning	Slow burning			Similar to paper	Similar to paper	Similar to paper
	Carbide & Carbon Chemicals Corp.	Goodyear Tire & Rubber Co., Inc.	Dewey & Almy Chemical Co.	Menasha Products Co. Sub. of Marathon Paper Mills Co.		Kalamazoo Vegetable Parchment Co. Paterson Parchment Co.	S. D. Warren Co.	Brownville Paper Co. Leerfield Glassine Co. Glassine Paper Co. Hamersey Mfg. Co. Hartford City Paper Co. Mountain Mill Corp. Hicklet Paper Corp. Oregon Pulp & Paper Co. Rhineclander Paper Co. Riegel Paper Corp. Thimney Pulp & Paper Co. Westfield River Paper Co.

ALS

which excel in some particular property.
be available for all purposes.

PRODUCTS				PROPERTIES
Uncoated	Lacquered Glassine	Waxed Glassine	Laminated Glassine	
				GENERAL
Physically treated paper	Coated physically treated paper	Coated physically treated paper	Multi-ply physically treated paper	Type of material
Continuous rolls & converted products	Sheets, continuous rolls & converted products	Sheets, continuous rolls & converted products	Sheets & continuous rolls	Forms available
Transparency to light & opaque	Transparent and opaque	Nearly transparent and opaque	Translucent and opaque	Clarity
Weight	.0008-.002	.0008-.003	.002 and up	Thickness Range, In.
	52	70	52	Maximum width, In.
Area	9600-20,600	6600-28,800	11,400 and up	Area Factor, sq. in. per lb.
				Specific Gravity, Approximate
				MECHANICAL
				Tensile Strength, lbs. per sq. in.
				Elongation, per cent
	10-25	8-40	26 and up	Bursting Strength (Mullen) lbs. per sq. in.
	6-20	5-38	20 and up	Tearing Strength (Elmendorf), Grams
				Folding Endurance
				CHEMICAL
Water Absorption	Moderate	Very low	Low	Water Absorption in 24 hr. immersion test, per cent
Moisture Vapor Permeability	.2-1.0	.2-1.0	.2-1.0	Moisture vapor permeability ² Grams/24 hrs./100 sq. in. at 100 deg. F. 95% R.H.
	Low	Low	Low	Permeability to gases
Resistance to acids	Moderate	Moderate	Moderate	Resistance to acids
Resistance to alkalis	Good	Good	Poor	Resistance to alkalis
Resistance to greases and oils	Good	Excellent	Excellent	Resistance to greases and oils
Resistance to organic solvents	Poor	Good	Good	Resistance to organic solvents
				PERMANENCE
Resistance to heat (Limiting Temp.) °F.	150-300° F.	Heat sealing	130-150° F.	Resistance to heat (Limiting Temp.) °F.
Resistance to cold (Limiting Temp.) °F.	-20° F.	-20° F.	-20° F.	Resistance to cold (Limiting Temp.) °F.
Resistance to sunlight	Good	Good	Good	Resistance to sunlight
Dimensional change at high R.H., per cent	Slight	Slight	Slight	Dimensional change at high R.H., per cent
Resistance to storage	Good	Good	Good	Resistance to storage
Flammability	Inflammable	Inflammable	Similar to paper	Flammability
Manufacturers	Hartford City Paper Co. Hazen Paper Co. Rhinelander Paper Co. Riegel Paper Corp. Westfield River Paper Co.	Deerfield Glassine Co. Glassine Paper Co. Fumersley Mfg. Co. Rhinelander Paper Co. Riegel Paper Corp. Thilmany Pulp & Paper Co. Westfield River Paper Co. Oregon Pulp & Paper Co.	Deerfield Glassine Co. Glassine Paper Co. Fumersley Mfg. Co. Hazen Paper Co. Rhinelander Paper Co. Riegel Paper Corp. Westfield River Paper Co. Thilmany Pulp & Paper Co.	

¹ Figures represent pull required to continue high to measure on same equipment and therefore

PROPERTIES	
	Fluid Greaseproof
GENERAL	
Type of material	Mechanical parchment
Forms available	Sheets, continuous rolls & converted
Clarity	Translucent
Thickness Range, in.	.001-.010
Maximum width, in.	160
area Factor, sq. in. per lb.	7200-25000
Specific Gravity, Approximate	
Tensile Strength, lbs. per sq. in.	
Elongation, per cent	
Bursting Strength (Mullen) lbs. per sq. in.	10-100
Tearing Strength (Elmendorf), Grams	8-40
Folding Endurance	
CHEMICAL	
Water Absorption in 24 hr. immersion test, per cent	High
Moisture vapor permeability 2 Grams/24 hrs./100 sq. in. at 100 deg. F. 95% R.H.	High
Permeability to gases	Modest
Resistance to acids	Good
Resistance to alkalis	Poor
Resistance to greases and oils	Good
Resistance to organic solvents	Good
PERMANENCE	
Resistance to heat (Limiting Temp., °F.	150-200
Resistance to cold (Limiting Temp., °F.	-20
Resistance to sunlight	Good
Dimensional change at high R.H., per cent	Small
Resistance to storage	Good
Flammability	Similar to paper
Manufacturers	Leerfield Cassin P. Demerco Hartford C. Kalamazoo Pu Nicolet Oregon P. Rhine Siegel P. Thimney

to continue tear after starting. Force required to start tear is too
ent and therefore is not normally determined.

²Using CAGL₂ in Test Dish; Method is described in ANCG7 Army-Navy Specification.

PAPER PRODUCTS							
Plain Greaseproof	Heat Seal Papers	Ordinance Material Wrapping Paper #1A-75	Ordinance Material Wrapping Paper #11	Ordinance Material Wrapping Paper #6	Kraft Paper	Laminated Kraft	Reynolds Al
Mechanical parchment	Resinous material coated on paper	Impregnated Crepe Grade A Greaseproof (Self-Stickin	Coated kraft - Greaseproof	Coated Crepe:Waterproof Greaseproof, Heat Sealing		Laminated kraft paper for liners	Laminated kraft-composition metal foil-rubber hydrochloride film
Sheets, continuous rolls & converted products	Continuous rolls, sheets	Rolls	Rolls or Sheets	Rolls or Sheets	Rolls & Sheets	Rolls & sheets	Rolls and sheets
Translucent and opaque	Translucent to opaque	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque
.001-.004		.015-.020	.002-.003	.008-.010	.002-.009		0.007
160	52	40	52	40	80	40	24
7200-25,400		2,300-2,500	17,000-14,500	3600	4600-16,600	4150-5200	2300-2600
					0.65		
		1300 - 1600	Ca. 10,000	2700 - 3100	35% of basic wt.		
					2-5		
10-60		25-30 for .016" thickness	26-32 for .003" thickness	25-32 for .009" thickness	80% of basic wt.	50-60	55
8-45		160 - 184	65 - 58	156	2 pts. per lb. of basic wt.		170-190
					10 double (Schopper)		
High	Coated side water-proof	Low	High	Meets 10SSC specs. for Waterproof	High	High	High
High	Low	Fairly Low	High	Low	High	1 to 5	.1 to 0
Moderate	Low				Permeable	Permeable	0
Good	Good				Poor	Poor	Good
Poor	Poor				Poor	Poor	Good
Good	Coated side resistant	Meets 10SSC specs. for Grade A	Meets 10SSC specs. for Grade A	Meets 10SSC specs. for Grade A	Poor	Poor	Good
Good	Soluble in lacquer solvents	Poor			Not resistant	Poor	Attacked by chlorinated & aromatic
150-240° F.	150° F.	Max flows about 140° F.	180° F.	140° F.	200° F.	150° F.	180° F.
-20° F.	-10° F.	-20° F.	-20° F.	-30° F.		Good	-25° F.
Good	Good				Colors will fade	Excellent	Excellent
Slight		Low			M.D. approx. 0.5% C.D. approx. 1.5%	Considerable	Slight
Good	Excellent	Good	Good	Good	Avoid dampness, high heat, & low humidity	Good	Excellent
Similar to paper	Similar to paper	Similar to wax paper	Similar to paper	Similar to paper	Burns readily	Burns readily	Slow burnin
Deerfield Glassine Co. Glassine Paper Co. Hawesley Mfg. Co. Hartford City Paper Co. Kalamazoo Vegetable Parchment Co. Micolet Paper Corp. Oregon Pulp & Paper Co. Rhinelander Paper Co. Siegel Paper Corp. Thilmany Pulp & Paper Co.	Hazen Paper Co.	Dennison Manufacturing Co.			Union Bag & Paper Corp.		

Method is described in AMC67 Army-Navy Specification.

³ (Depends on amount of moisture present, solubility of gas in water, moisture vaporproofness of film, and vapor pressure differential.)

METAL FOIL LAMINATIONS

	Kraft Paper	Laminated Kraft	Reynolds A1	Reynolds A10	Reynolds A12	Reynolds A100	Reynolds B30	Reynolds B40	Reynolds D.W.1.	Aluminum
		Laminated kraft paper for liners	Laminated kraft-composition metal foil-rubber hydrochloride film	Laminated kraft-composition metal foil-cellophane-lam seal coating	Laminated kraft-lead foil-cellophane-Rein seal coating	Laminated kraft-composition metal foil-bond paper-Rein seal & coating	Laminated kraft paper-lead foil kraft paper	Laminated kraft paper-lead foil	Laminated lead foil-glassine paper-cellophane-Rein seal coating	
	Rolls & Sheets	Rolls & sheets	Rolls and sheets	Rolls and sheets	Rolls and sheets	Rolls and sheets	Rolls and sheets	Rolls & sheets	Rolls & sheets	Rolls &
	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque	Opaque
	.002-.009		0.007	0.007	0.0075	0.008	0.012	0.0065	0.0035	.0003-.0005
	80	40	24	24	24	36	36	36	24	30.5
	4600-16,600	4150-5200	2500-2600	2500-2600	1650-1800	2130-2400	1440-1570	1800-2060	2540-2800	10,200
	0.65									2.7
	35% of basic wt.									6500-11000
	2-5									2-10
	8% of basic wt.	50-60	55	60	65	50-60	90	40	55	16-100
	2 pts. per lb. of basic wt.		170-190	110-150	150-150	120-150	255-250	125-145	60-80	
	10 double (Schopper)									
	High	High	High	High	High	High	High	High	Low	0
	High	1 to 5	.1 to 0	.1 to 0	.1 to 0	.1 to 0	.1 to 0	.1 to 0	.1 to 0	Depends on thickness
	Permeable	Permeable	0	0	0	0	0	0	0	0
	Poor	Poor	Good	Poor	Poor	Poor	Poor	Poor	Poor	Poor to Good
	Poor	Poor	Good	Poor	Poor	Poor	Poor	Poor	Poor	Poor to Good
	Poor	Poor	Good	Good	Good	Fair	Poor	Poor	Good	Good
	Not resistant	Poor	Attacked by chlorinated & aromatic solvents	Attacked by aromatic & active solvents	Attacked by aromatic & active solvents	Attacked by aromatic & active solvents	Poor	Poor	Attacked by aromatic & active solvents	Good
	200° F.	150° F.	180° F.	180° F.	180° F.	180° F.	180° F.	180° F.	200° F.	700°
		Good	-25° F.	-25° F.	-25° F.	-25° F.	-25° F.	-25° F.	-25° F.	-120°
	Colors will fade	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Unaffected
	M.D. approx. 0.5% C.D. approx. 1.5%	Considerable	Slight	Slight	Slight	Slight	Slight	Slight	Slight	None
	Avoid dampness, high heat, & low humidity	Good	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Excellent	Unaffected
	Burns readily	Burns readily	Slow burning	Slow burning	Slow burning	Slow burning	Slow burning	Slow burning	Slow burning	Not combustible under ordinary conditions
	Union Bag & Paper Corp.		Reynolds Metals Co.							Aluminum America Johnson Tin Foil Metal Co.

METAL FOILS				PROPERTIES
Aluminum Foil	Tin Foil	Lead Foil	Tin and Lead composition foil (4% tin)	
				GENERAL
				Type of material
Rolls & Sheets	Rolls & Sheets	Rolls & Sheets	Rolls & Sheets	Forms available
Opaque	Opaque	Opaque	Opaque	Clarity
.0003-.005	0.0006-0.002	0.0006-0.002	0.0006-0.002	Thickness Range, in.
30.5	26 $\frac{1}{2}$	26 $\frac{1}{2}$	26 $\frac{1}{2}$	Maximum width, in.
10,250	3750	2400	2500	Area Factor, sq. in. per lb.
2.7	7.3	11.5	11.1	Specific Gravity, Approximate
				MECHANICAL
6500-11000				Tensile Strength, lbs. per sq. in.
2-15				Elongation, per cent
16-17	4-7	4-6	6.5-9	Bursting Strength (Mullen) lbs. per sq. in.
				Tearing Strength (Elmendorf), Grams
				Folding Endurance
				CHEMICAL
0	0	0	0	Water Absorption in 24 hr. immersion test, per cent
Depends on thickness 0 to high	Depends on thickness 0 to high	Depends on thickness 0 to high	Depends on thickness 0 to high	Moisture vapor permeability 2 Grams/24 hrs./100 sq. in. at 100 deg. F. 95% R.H.
0	0	0	0	Permeability to gases
Poor to good	Poor to good	Poor to good	Poor to good	Resistance to acids
Poor to good	Poor to good	Good	Poor to good	Resistance to alkalies
Good	Good	Good	good	Resistance to greases and oils
Good	Good	Good	good	Resistance to organic solvents
				PERMANENCE
700° F.	300° F.	500° F.	450° F.	Resistance to heat (Limiting Temp.) °F.
-120° F.				Resistance to cold (Limiting Temp.) °F.
Unaffected	Unaffected	Unaffected	Unaffected	Resistance to sunlight
None	None	None	None	Dimensional change at high R.H., per cent
Unaffected	Unaffected	Unaffected	Unaffected	Resistance to storage
Not combustible under ordinary conditions	Not combustible	Not combustible	Not combustible	Flammability
Aluminum Co. of America Johnson Tin Foil & Metal Co.	Reynolds Metals Co.			Manufacturers

MACHINERY EQUIPMENT

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The War and Packaging Machines

LONG before the United States actually entered the war as a participant, makers of packaging machinery and equipment were keenly aware of the fact that they could plan to play an important part in war production. They were not slow in offering their services to the Government; as a result their plants have been engaged from 60 to 200 per cent of capacity in direct war work and in some cases additional capacity and equipment were added in order to take on an extra load.

Early evidence—if any were needed—of the attitude of the packaging machinery manufacturers was provided back in November 1941. At that time, *Modern Packaging*, with the help of various machinery people and in conjunction with what was then OPM, prepared a special insert, "ABC of Priorities for Machinery Users." The machinery people obtained several thousand copies of this insert for the use of their customers, and exerted every effort to make sure that the system was both understood and observed.

The what and why of "L" Orders

The Priorities System gave way to General Limitation Order L-83 "to restrict the manufacture and distribution of industrial machinery." This order was issued April 9, 1942, by the WPB. Various amendments have been added, the latest of which came December 26, 1942. This Order with its amendments is the one under which the packaging machinery business is being operated now.

It prohibits acceptance of orders for, or delivery of, or acceptance of delivery of, any critical industrial machinery, whether new, used or reconditioned. Packaging and labeling machinery is specifically included in the list which accompanies the Order, "On orders for a single machine of a value in excess of \$200."* Approved orders must bear a preference rating of A-9 or higher. The limitation order does not apply to orders covering repair or maintenance of existing equipment in amounts of less than \$1000 within a four-week period. Certain exemptions are made so as not to interfere with the normal conduct of business transactions. An interpretation issued in December 1942 provides that the selling price of a used machine is established by adding the cost of necessary repairs to the price of the machine.

It is rather too much to expect that any such inclusive order would be instantly or universally popular. Never-

theless, it can be said that the Government men, the packaging machinery men and the users of machinery have cooperated to carry out the intent of the law, for it should never be forgotten that these orders have the force of a law. Like every other order, the intent of L-83 is not merely to save critical materials but also to save critical manpower. For instance, as a member of the WPB staff pointed out, petitions are often presented for priority on proposed machinery purchases on the ground that the use of such a machine would release labor for war work. All too frequently the petitioner overlooks the fact that the manufacture of the machine would involve the use of skilled mechanics who could work on projects much closer to the direct war effort. The real intent of the order is to conserve the most critical labor and material.

One example of a bit of confusion in the order (afterwards straightened out) was raised when the question was asked, "Are stitching and stapling machines packaging equipment?" The term "packaging machinery" is a very broad, general classification. Stitching and stapling machines, WPB admitted, have many uses outside of the field of packaging. Manufacturers of equipment of this kind were therefore inclined to interpret the order as not applying to them. The point was finally decided by an interpretation which placed these machines under the jurisdiction of the order. However, the interpretation was not punitive retroactively. Manufacturers of this equipment who had been selling without regard to preferential ratings were assumed by WPB to have been acting in good faith.

Administrators of Order L-83 regard two particular questions of machinery users as most difficult to handle. One of these is involved in the question, "Why can't I have a second-hand machine without priority rating?" Under the order only *dealers* may purchase equipment for re-sale, but sales must be on A-9 priority or better. The dealer or manufacturer, however, cannot buy for his own use, the reason being obvious: Evasions of the intent of the law would be too easily perpetrated, for a machinery user with his own machine shop could very readily pose as a dealer, make purchases for his own uses, and thus defeat the intent of the order besides working a hardship on others not so situated.

Hardest to understand are the cases where priority ratings are denied a petitioner immediately after his competitor has been allowed one. The explanation seems to be that under the allocation plans, as soon as enough productive capacity has been provided to produce the required quantity of a product, then it is no longer in the public interest to permit further equipment to be sold which will increase that quantity above current needs. This situation has of necessity often

* Other machinery covered by the Order includes:
Pulp and paper making machinery, single machines over \$1000.
Paper converting machinery, single machines over \$200.
Printing and publishing machinery single machines over \$200.
Bakery machinery, single machines over \$200.
Confectionery machinery, single machines over \$200.
Beverage bottling machinery, single machines over \$200.
Coffee grinding machinery, single machines over \$50.
Food slicing and grinding machinery, single machines over \$50.
Dairy machinery, single pieces over \$300.
New woodworking machinery, single units over \$250.

led to the denial of a priority rating immediately after the preceding applicant has been granted one.

What is "essential"?

As in all branches of the WPB, the question of *essentiality* keeps cropping up in the machinery division. As a matter of fact, a good case for *essentiality* might be made for almost any consumer product; but it would take the wisdom of Solomon to pass on the *degree* of essentiality.

Another difficult problem is posed when a would-be purchaser, possessing an A-9 rating, finds that he has only a "hunting license" and that in actuality he must have a rating higher than A-9 to obtain the desired equipment.

The explanation lies in the different component parts of the average machine, and it depends, too, on how fully occupied the manufacturer may be in the various parts of his plant. The A-9 rating is merely a release; if the machine were completely built as a stock number on the floor of the manufacturer, it could be readily delivered on such a priority rating. That rating also permits the manufacturer to make the machine—*provided* he has the necessary time and materials. The average machine is probably 75 per cent cast iron, which is relatively easy to obtain. But also going into that machine—in smaller quantities, it is true but nevertheless highly critical—are such materials as virgin copper, aluminum and steel alloys. As to productive capacities the over-all picture among machinery manufacturers shows that they are experiencing a peak load of at least 120 per cent, but the production schedule of most of these machinery manufacturers is set up on such a high rating basis that it is difficult if not impossible to fill an order with a low rating unless there just happens to be manufacturing time in between the higher rated war orders.

It doesn't follow that it is impossible to obtain the necessary high ratings. The Government has a definite program for the production of foods for the Army, Navy and Lend-Lease purchases. This program is given the right of way and contractors who are working on such projects will have no difficulty in obtaining the necessary priorities.

Few new machines

Naturally, due to the complete enlistment of the package machinery people in the war effort, very little development of new equipment could be expected. One significant new machine, however, appeared as an assured success during 1942, although the engineering had been done quite a while before Pearl Harbor. This machine, developed for a pharmaceutical company, performs an operation hitherto always done by hand. An alert sales engineer observed this hand operation in his customer's packaging department—the insertion of wads of cotton in bottles containing hygroscopic products. The operation challenged this engineer's imagination and the eventual outcome was manifested in the installation even during 1942 of a battery of four "Kottoners."

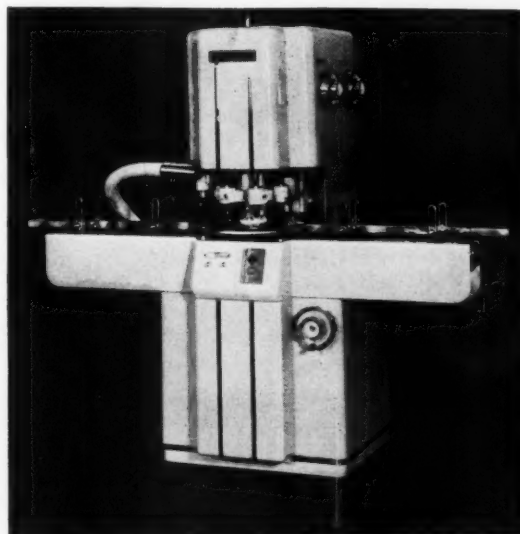
Military packaging

Package machinery makers made an important direct military contribution when they adapted machines familiar to all package production men to perform for the ordnance department a packaging operation which traditionally had been done by hand—loading cartridges into boxes. The package itself is not new but the method of handling for loading is an innovation. One of the manufacturers says that it formerly required 10 workers loading cartridges to keep pace with a single labeling machine. Now, through the use of a mechanical cartridge-box loader, seven of these ten are released. The cartridges come "scrambled" in bulk to the machine which unscrambles them mechanically and feeds them for the hand-loading operation. Other machines are now labeling the cartons mechanically as compared with the former hand methods.

One most interesting development is a machine which loads fabric machine-gun belts with 30-calibre cartridges. Formerly one operator using a manually operated device loaded four of these belts per hour. A machine was devised to meet essential requirements, namely, perfect alignment of the 250 cartridges in a belt, to avoid jamming of the gun in use, to avoid skipping any of the pockets which hold bullets, and to distribute properly the three types of cartridges—that is, so many tracers, so many armor piercing cartridges, etc.—in the prescribed order in the belt. This machine, fully automatic except for the insertion of the belts, has increased the output to 15 belts per operator per hour.

Another manufacturer has developed a machine to load automatically five 30-calibre cartridges in the spring clips at the rate of 750 cartridges per minute. Still another development is an automatic dipper by means of which two or more coatings of flexible wax are applied to cartons containing emergency rations and small arms ammunition.

At the rate of 40 per minute, this machine inserts cotton into bottles containing hygroscopic tablets.



Civilian conversions

In the field of civilian packaging activity, the engineering skill and the mechanical facilities of machinery manufacturers were put to good use in conversions. For instance, tobacco manufacturers, denied the use of tin, have changed 100 per cent to paper packaging or to glass. This called for adjustments, sometimes of a complicated nature, to handle the new material. To be sure, the desire to retain the precious tin packages was sometimes supported by emphatic pleas of essentiality on the ground of maintaining the morale of the troops, etc. But experience has shown that the troops are just as well satisfied with tobacco in paper packages, so that on the whole the tobacco manufacturers have given evidence of willing and patriotic cooperation, and the paper packages have proved their ability to keep the product in good condition.

In other industries, conversions have been equally drastic. According to WPB estimates, the paint industry, permitted to use five or six tons of critical metal for equipment, was able to release 69,000 tons of plate by changing to paper packages. Similar savings were made when spice companies rebuilt their machines to handle paper cartons instead of tin. A prominent kitchen cleanser manufacturer changed his package from the metal-end fibre can to an all-fibre package.

His own engineers adapted the machines, and an untold tonnage of metal was released for war uses.

Interestingly enough one conversion was proposed but not made. This was in the baby food field where full investigation of all the factors involved revealed that it would require complete new power plants, retorts and special instruments if processing in glass were adopted. This would necessitate the use of more highly critical material and labor than would be warranted by the savings in metal plate for the cans—and baby food is still a top essential item in America!

Strangely enough, developments in dehydrated and frozen food processing have called for very little change in the packaging machinery. To be sure, packers of these foods have been granted high priorities for obtaining equipment. But the equipment itself is the same familiar machinery that has handled cartons, machinery bags, envelopes, wrappings—in fact, all the standard packages for many years.

Early in the era of shortages, the package machinery manufacturers, foreseeing the impending situation, went into reverse on their selling methods and launched campaigns to educate their customers how to prolong the life of their equipment. Many of them used their advertising space for this purpose, and all of them instructed their engineers and sales representatives to work with their customers with this end in view.

Factors of Mechanization

by C. H. Lambelet

IRRESPECTIVE of the product, practically every manufacturer at some time or other is confronted with the question, "Does my operation warrant mechanization?"

This question is an important one as it involves a major investment in equipment which, if not operated sufficiently and efficiently, might become so much "dead wood." If the proper type of equipment is not installed, its productivity might be too large or too small, not elastic enough in range, not applicable to proper operation on various types and sizes of present or future contemplated packages and possibly requiring too much mechanical attention for the size and personnel of plant in which it is installed. At just what point in growth one should resort to machines is difficult to answer.

If one takes into consideration the various types of equipment which are used in packaging today, whether it be wrapping, cartoning, casing and sealing, liquid or dry filling, tube filling, capping, labeling, etc.—the possible combinations of these various types and the varying conditions obtaining in different plants makes the question even more complex. The factors and conditions and problems which should be taken into ac-

count when one is considering switching from a hand operation to a mechanical one follow.

How about the package?

First, forget production. Strange as it might appear, the first factor to determine is the question: Does the package lend itself to mechanical handling? Because irrespective of what levels production might reach, if that package which at the present time, is being fabricated by hand methods, does not lend itself to machine handling, the installation of equipment might become more of a headache than a help.

As an example here are two cases wherein a machinery company was asked to supply equipment for two different packages which were handled manually. In both of these cases, production warranted equipment but the type of work which the machine would be called upon to do was of such a nature that in one case there was (and is) no machine which could handle the job and in the other there were but two types of machines which could do the work. In either case, as the packages came off the machine they would have to be rehandled manually in order to correct the defects which, due to the design of the package, would necessarily occur.

In designing a package, even though one may contemplate handling it manually, it should be kept in mind that at some future time it might become so successful as to warrant handling it mechanically. If for instance, it is a glass container, the glass supplier should be told that possibly at a later date this package is to be handled mechanically and asked to determine whether its design will lend itself to such handling. As an example, the throat or neck of a bottle might be such that, while no difficulty would be encountered in filling it by hand, when handled on an automatic filler, the size of the opening, the length of the neck, in fact, its very shape, might prevent the user from getting the full productivity of the automatic machine. It might be too top-heavy to convey readily; its contour might cause it to "climb" or "lock" on the conveyor chains, or its shape might not lend itself to accurate registration in labeling.

Machinery is still machinery and while its functioning is almost human at times, still there are certain human attributes which cannot be built into it, of which, possibly, a most important one would be the faculty or ability to compensate for continually varying conditions.

The bottles might vary $\frac{1}{8}$ in. in width. This does not mean anything to the hand operator, but can cause troubles in equipment. Labels might vary $\frac{1}{8}$ in. in dimensions and still the hand operator will center them on the bottle and make a perfectly acceptable package, whereas in a machine operation the location of the labels will vary or even "skew" with resultant unsatisfactory appearance.

When changing from manual to mechanical operation, in order to give the user full benefit in productivity with consequent savings, equipment has to be catered to and given accurate material to handle. While the machinery manufacturer realizes that he cannot count on receiving perfect packages and package parts and while he can compensate for a certain amount of inequalities in materials and still have his machine produce acceptable packages, yet the limitation of his equipment is much greater than that of human hands.

Hands or machines?

Every packaging machinery manufacturer has been up against this problem and it is not always easy to convince the prospective user of equipment that greater care must be taken in the materials when handled mechanically instead of manually. However, it is all a question of educating the package suppliers and the packager's own employees. When once this fact has been drilled into them there is no great difficulty in supplying acceptable material to the machine.

When contemplating the mechanization of an operation which previously has been done manually and when contacting the machinery builder, it is best to allow him to criticize frankly the materials that are being used. While the first reaction might be that any changes suggested are for his own benefit, one should consider that he is trying to eliminate headaches which he can foresee in a package. The machinery builder eliminates them for the user and makes his equipment a profitable invest-

ment for his customer. He is far-seeing enough to realize that the first sale of equipment might possibly be the beginning of a further friendly, and, for both sides, advantageous business relationship.

Even if suggestions which are made might cause additional expenditures for material, in the vast majority of cases the benefit which will derive from mechanization will more than offset this and still give an added profit.

Semi-automatic or automatic?

Another difficult question to decide is whether semi-automatic or fully automatic equipment should be installed. To answer this question is practically impossible as the conditions in each plant vary. This should be determined by a study of the individual case rather than by some hard and fast rule.

While many manufacturers at times or during certain portions of the year, could use fully automatic equipment, they have found it more economical and wiser to have semi-automatic equipment in conjunction with an efficient conveying system. At such times they so set up their semi-automatics in conjunction with the conveyors to form what might be called a "semi-automatic-automatic" line. Such an arrangement has many possibilities, is elastic and can be changed to serve varying conditions as they arise. In these cases, skids can profitably be installed in the form of channels or "I-beams" under the machines so that they can be readily moved by means of lift trucks and placed where desired.

Management plays a very important part in the efficient operation of equipment. Methods that are being efficiently used, with reference to routing or handling the product for manual packaging, might be the most uneconomical as far as machine operation is concerned.

Equipment not only lives with the purchaser, but he must learn to live with it. The installation of a conveyor belt will very often repay many times the discarding of trays or racks formerly used. In catering (and the word is used advisedly) to machines, one should not be afraid to spend money wisely.

More people or more machines?

Another factor enters into the purchase of equipment. For example, a product is successful, and in order to have enough production, more hands must be hired. Floor space does not allow this. However, by proper choice of mechanization, even if only operating part time, the question of seeking new quarters, increasing fixed charges, costs of moving with its inherent effect on production, possible loss of old and trained employees, can be eliminated. There need not necessarily be an increase in the number of employees. This should all offset the possible necessity of employing a mechanic to take care of the equipment.

On the question of mechanical supervision, it should not be forgotten that the machine which is working in the plant requires a certain amount of attention, of oil and grease, of cleaning and in general care the same as one would give an automobile.

Weighing and Filling Dry Products

THE accurate weighing and filling of dry-product containers is of increasing importance to packagers in view of the more rigid standards of weight and fill being promulgated by the Food and Drug Administration. The difficulties of achieving such accurate weighing and filling are further increased by the tendency—as indicated by recent administrative actions—to restrict package sizes to dimensions far closer to the volume occupied by the contents than was formerly demanded. Such restrictions reduce the orifice through which the package may be filled, make settling of material more difficult and in other ways complicate the physical problem of handling materials. Automatic machinery, however, seems fully capable of taking care of these difficulties, provided they are adequately appreciated and anticipated.

Systems of filling

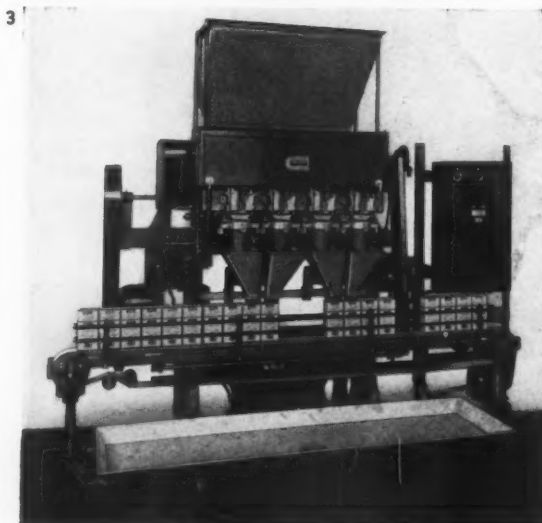
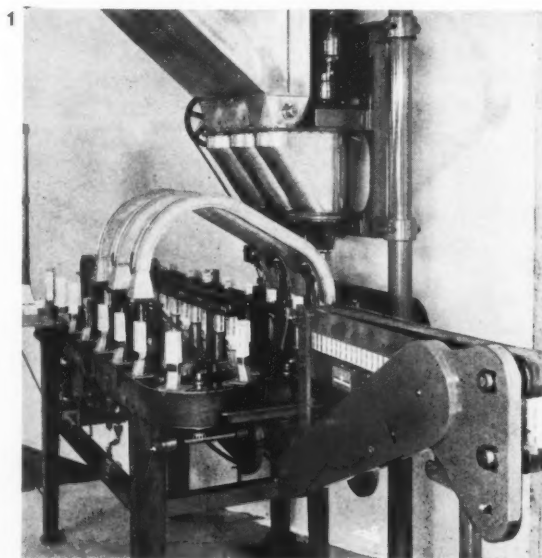
There are four basic methods of weighing and filling dry materials—accurate filling, gross weight weighing, net weight weighing and a combination of accurate filling and gross weight weighing.

Accurate filling is perhaps the simplest method. The correct quantities of the product are measured mechanically without the use of a weighing device. One way of accomplishing this is to measure by volume. Another

is to use a definitely timed or regulated feeding of the material. As long as the bulk of the material remains uniform, good commercial accuracies can be guaranteed on correctly built machines of this type. If, however, the nature of the product is such that it varies in weight per unit of volume, then measuring by this method may not be sufficiently accurate for commercial requirements.

Accurate filling is successfully utilized for such products as scouring powder, jelly crystals, dessert powder, tooth powder, face powder, cut tea for tea balls and granular salts. Many machine units are available capable of handling various sizes of packages and with speeds ranging from 10 per minute to the neighborhood of 120 per minute.

1. Carton filler for dry products with bottom and top folding and gluing mechanisms. 2. Filler for fluffy macaroni which shakes product through a chute into packages. 3. Four scale net weigher for macaroni, etc., with vibrator feeders.

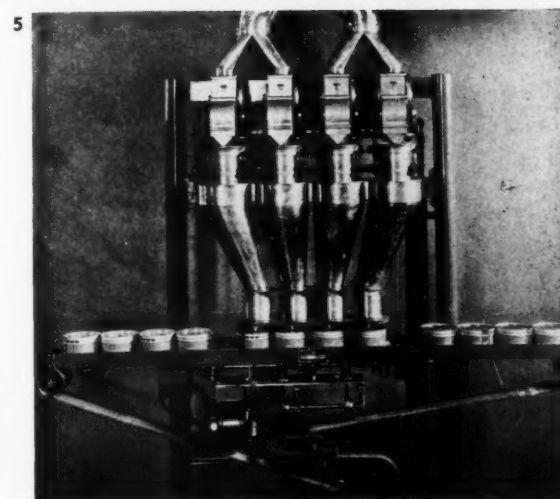
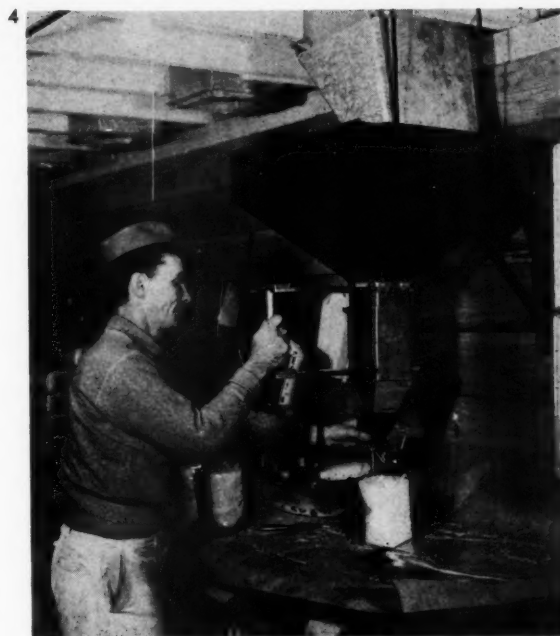


Gross weight weighing involves the use of scales which weigh not just the product alone, but, rather, the package and its contents. For accuracy by this method, therefore, there must be a relatively high degree of uniformity in the weight of packages. This may be achieved through the inherent nature of the package selected or through the use of a package-sorting scale (see article on Check-Weighing Scales and Devices).

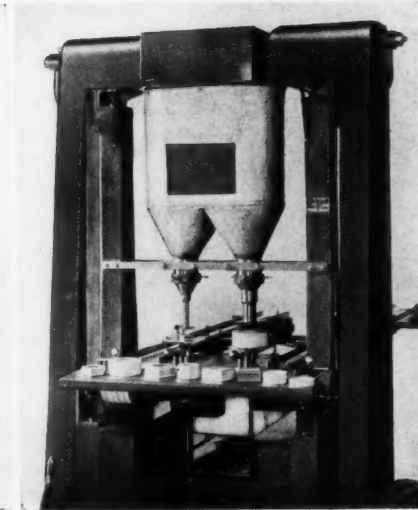
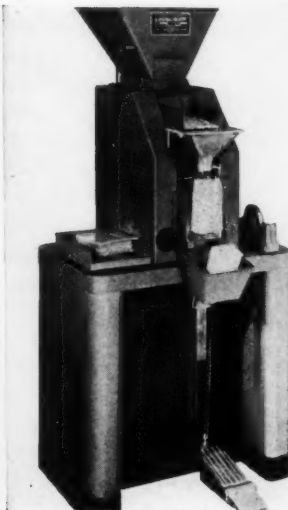
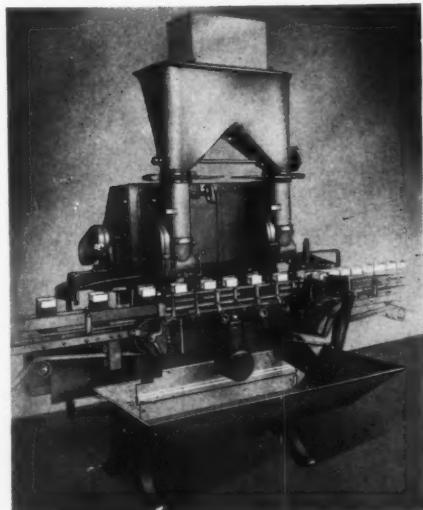
The flow of material from the feed-hopper to the package is controlled by the scale beam on one end of which the package rests during filling. Thus, when the right amount of material is dropped into the package, the scale beam trips a shut-off which stops the flow of the material instantly and passes the package ahead to the next position. To speed up production, particularly on larger sizes of packages, two scale machines are frequently utilized. The first scale fills a bulk load of from $\frac{2}{3}$ to $\frac{9}{10}$ of the total quantity to be filled. The final load, weighed to extreme accuracy, is delivered by a fine stream to the second scale.

Gross weight weighing is particularly favored where accurate weighing of non-free-flowing commodities is necessary. Typical uses include powdered sugar, cocoa, malted milk, prepared flour, etc. Speeds range from 10 per minute to 70 per minute.

A combination of gross weighing and accurate filling (i.e., measuring) is sometimes used to achieve maximum speed and high accuracy. A typical instance is found in the bag-flour packer where it is further desired to achieve a tightly packed bag. The latter factor makes straight gross weighing impractical. By resorting to a

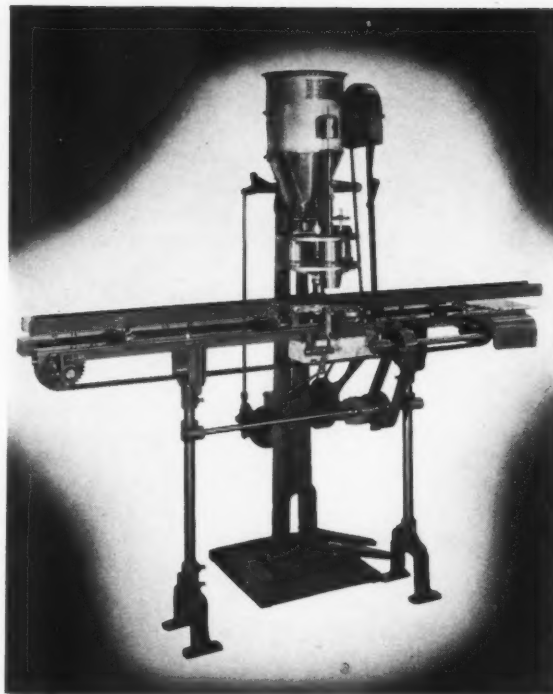


4. Volume filler, hand operated, for filling dry products.
5. Automatic net weigher with power feed for filling four packages at once. 6. Semi-automatic filler for gross weighing, volume filler or augur packing. 7. Predetermined weight filler with electrically vibrated feed feed plates. Scale beam controls electric shut-off mechanism. 8. Two-scale gross weighing filler, fully automatic, for free flowing and non-free flowing materials.

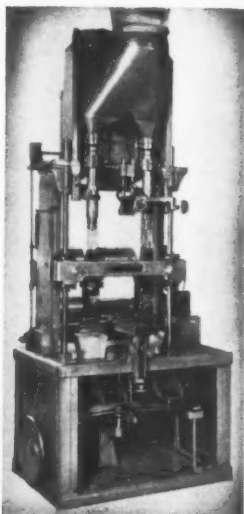




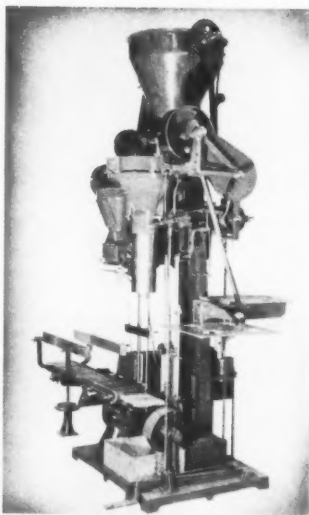
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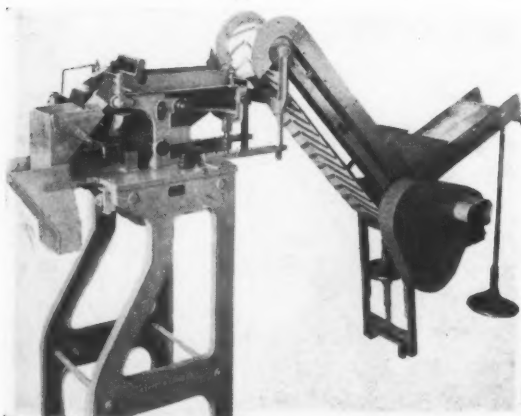
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9. Duplex automatic filler with cap pressing device.
10. High speed volumetric filler with automatic conveyor.
11. Automatic machine which forms a continuous tube of transparent sheeting, bottom seals, fills top seals and severs sealed packet. 12. Augur packer for filling, packing and weighing powdered products into bags.
13. Conveyor net weight scale for free flowing products such as crackers, cookies, etc. Weights up to $\frac{1}{2}$ lb.

worm packer for the machine's first station, the greater part of the bag's contents can be packed in tightly, at reasonable speed, without weighing. To get weight accuracy, the filling is finished off at one or two subsequent stations by directing a fine stream of material into the bag while it rests on a platform scale.

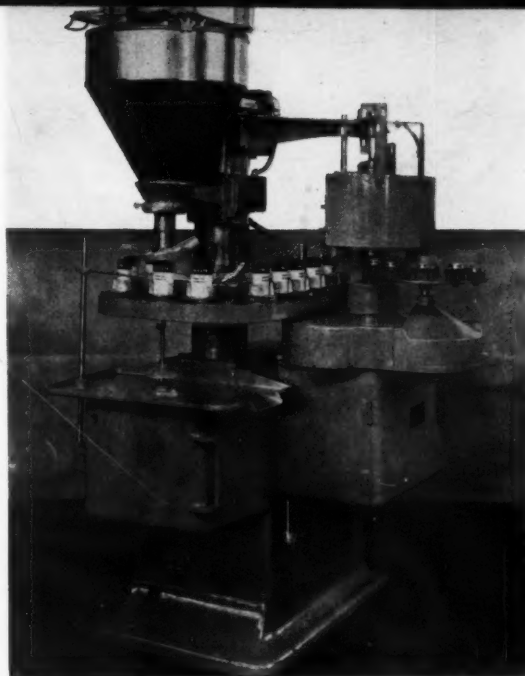
Net weight weighing is a system in which the package contents are weighed separately before being transferred to the package. A first essential for this type of weighing is that the product be free-flowing or at least semi-free-flowing. Obviously, this system cannot be utilized if the material is sticky and tends to build up and cling to the feed-hopper or funnel surfaces.

On net weight filling machines, the hopper feeds into a bin arranged on a scale platform. When the bin has received the predetermined weight, shut-off action occurs and the contents of the bin are dumped or otherwise transferred to the package.

Net weight weighing is utilized for such products as coffee, salt, tea, rolled oats, etc. Speeds range from 10 per minute to 100 per minute.

A wide range of container types are utilized for dry products, including folding cartons, set-up boxes, fibre canisters, metal cans, glass bottles and jars, etc. Certain

14. Automatic combination filling and capping machine with lid transfer and feeding device. 15. Dry product filling machine in operation, filling canister with powdered soap.



14



15

basic considerations, however, affect the design of all of these if they are to be successfully and economically filled on standard types of machinery. Thus, for instance, containers with narrow neck openings, which might be suitable for liquid filling, cannot be successfully utilized for packing powders.

A prime consideration in the selection of any container for powder filling involves the choice of a package with a suitably wide filling opening. Users of fibre-bodied canisters or metal cans sometimes solve this problem by filling through the open bottom end of the container and then seaming on the bottom. The limit of auger diameter is thus substantially increased and with it the potential rate of fill.

The folding carton and many types of paper bags now offered are well suited for packaging many of our widely used dry products. A number of entirely acceptable styles of each of these basic types of container are available. In either case, careful checking is suggested to determine accurately the adaptability of the product to the particular container selected. Such adaptability will concern the protection provided against leakage and contamination, the consumer's convenience and the merchandising appeal which the package provides.

Among the cartons, the sealed end type with extended flaps is extremely popular for products which are liable to sift. Bags also enjoy wide usage in this familiar field and improved standards in construction and design now definitely assure an increasing consideration of the advantages of this type of package.

The company whose requirements are not large can install an inexpensive hook-up which will help to lower packaging costs. As need demands more production, this first installation can be replaced piece-meal by more automatic and faster units. Thus an output as low as

5,000 per day will justify packaging equipment of some sort being installed.

With folding cartons there are certain basic operations to consider. For some carton packages all will be needed, while for others only part are necessary.

- (1) Carton feeding and forming
- (2) Bottom sealing
- (3) Lining
- (4) Filling or weighing
- (5) Carton closing
- (6) Wrapping

The usual practice is to handle each of these tasks on an individual unit, but in some cases it is practical to take care of several on a combination machine.

With paper bags current practice embraces automatic approaches comparable to those available for use with cartons. The extent to which these mechanical approaches are utilized is optional with the customer. A typical automatic paper bag line would provide standard types of equipment available for the following operations:

- (1) Feeding, opening and registering bags
- (2) Weighing contents and filling bags
- (3) Settling and sealing bags
- (4) Nesting and packing bags in shipping containers

These functions are handled by correlated equipment designed with a particular view toward making progressive approaches from minimum to full mechanization completely practical. Photographs show typical plant installations and some of the more widely used equipment for paper bag packaging and handling.

Credits: Photos 1, 5, J. L. Ferguson Co. 2, 8, Pneumatic Scale Corp., Ltd. 3, 7, 10, 12, Triangle Package Machinery Co. 4, Sanitary Dispenser Co. 6, U. S. Automatic Box Machinery Co. 9, 11, 13, 15, Stokes & Smith Co. 14, F. J. Stokes Machinery Co.

Check-weighing Scales and Devices

A WIDE variety of devices have been developed to permit packagers to check and control the accuracy of fill of containers. These fall into three general groups: (1) check-weighing scales, (2) automatic weight-sorting equipment and (3) volume outage detectors.

In the selection of packaging and check-weighing scales, one of the essential things to consider is the proper scale for the particular job. In other words, a scale which is built with sufficient sensitivity for weighing 10-lb. packages would not have the necessary sensitivity for 1-oz. or 3-oz. packages. The same thing is true when packages run up to 50 and 100 lbs. The operation of the packaging and check-weighing scale should be automatic, so that the operator can easily tell when the correct weight is reached. Many scales offer quite a wide indicator travel per ounce, which means that the weight tolerance of the package can be kept down to the mere fraction of an ounce. This is highly important when the packages are very small.

Just as care must be exercised in the selection of a scale to fit the particular capacity weighing job, so must the same care be used in seeing that the scale has been designed to be used under those particular working conditions. For example, in plants where moisture and steam are common, the same type of scale used to check and package flour and other dry materials could not be safely used with any assurance of continued scale accuracy and long service.

Check-weighing scales

For smaller packages ranging from a fraction of an ounce up to 100 lbs., the balance type of scale is most commonly used for check-weighing. The development of an over-and-under weight indicator has made the balance type of scale especially well adapted for production and check-weighing of packages up to 100 lbs. This type of scale can be built to a high degree of sensitivity, is not seriously affected by machinery vibration

and weighs correctly in any normal out-of-level position. The scale is simple in structure, does not require a great deal of service and simplifies the process of weighing and of supervision.

There are a number of different models and types of over-and-under weight balances designed and constructed to take care of various commodities and packaging operations. For floor or low bench operations, a top reading dial can be provided. In some scales, the tower is inclined, thus setting the dial at the normal reading angle and relieving strain on the operator.

In all of these various types, the scale dial shows the zero reading, which indicates the exact weight point. The dial may also be provided with weight graduations or tolerance marks. Where graduations are used, the operator or inspector is able to determine the amount of weight error in the package, thus affording a guide in adjusting the filling equipment. If the scale is used for checking different commodities, the dial may be equipped with adjustable mechanical tolerance markers.

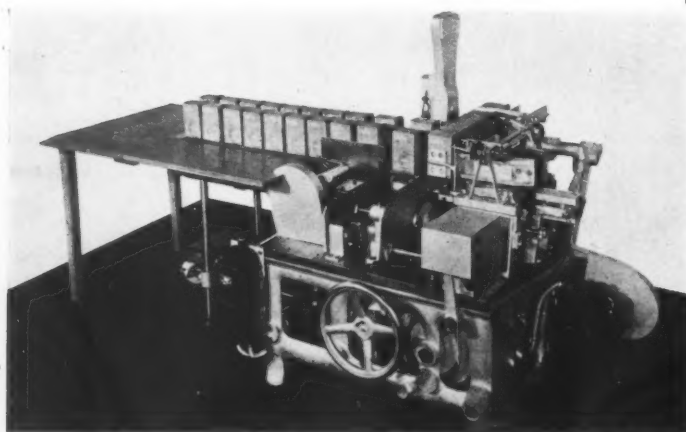
For check-weighing larger packages, some type of beam scale or a dial scale is generally used. A recent development, which tends to make the beam scale well adapted as a packaging scale, is that of an over-and-under weight indicator. This serves the same purpose to the beam scale as the over-and-under weight dial does to the balance scale.

In hand filling, it is of course essential that all packages be weighed. Automatic weighing fillers are subject to occasional variations for reasons which are difficult to control. Periodic check-weighing (every 10th or 100th package, as need indicates) is, therefore, usually resorted to as a check of the continuing accuracy of fill.

Automatic weight-sorting equipment

Where need requires, it is sometimes found desirable to utilize automatic equipment to sort packages by weight.

One type which has achieved fairly wide usage is set



1. Automatic check weigher designed for inclusion in packaging line. Machine pushes out overweight and underweight packages. Correctly filled containers proceed along belt. Photo Arenco Machine Co., Inc.

into the conveyor line so that packages are passed over a weighing pan. Each package is momentarily lifted from the conveyor chains for weighing. On the opposite end of the scale beam, a pan carries a standard weight container against which each successively produced package is to be tested. Containers which balance or over-balance the standard container are redeposited upon the chain and carry straight along the conveyor line without interruption. Containers of insufficient weight to balance the standard are automatically shoved off the conveyor by a pusher bar.

Another type of sorting scale is used to examine packages prior to filling rather than filled containers. Since the weighing of a filled container gives only a check on the total weight, it is sometimes desirable—and even efficient—that the weight of the container itself be predetermined.

Articles to be check-weighed are fed to the scale which pushes aside the under-weights or the over-weights to pass on to the filling machines. Since light packages are separated from heavy containers, it is possible, at a later time, to reset the scale, make compensating adjustments on the filling machines and thus to utilize both the light and heavy containers if these occur in appreciable quantities.

New classification means

One company has developed a new method of accurately classifying articles by weight during the process of manufacture or packaging.

Featuring electronic means of classification, the unit requires no synchronizing with the feeding conveyor, uses no photo cells or mercury switches, and operates at unprecedented speed and accuracy. Compact, single unit design facilities ease installation in new or existing production lines.

Its operation is unique in that weights are taken at their dynamic value, thus eliminating the mechanics normally required to place the commodity on the scale, release the weighing mechanism and again put the commodity into motion. Packages or articles to be weighed are uninterruptedly passed over the sensitive weighing unit and are automatically diverted into conveyor channels corresponding to their weight classification, the number of classifying channels being determined by the users requirements.

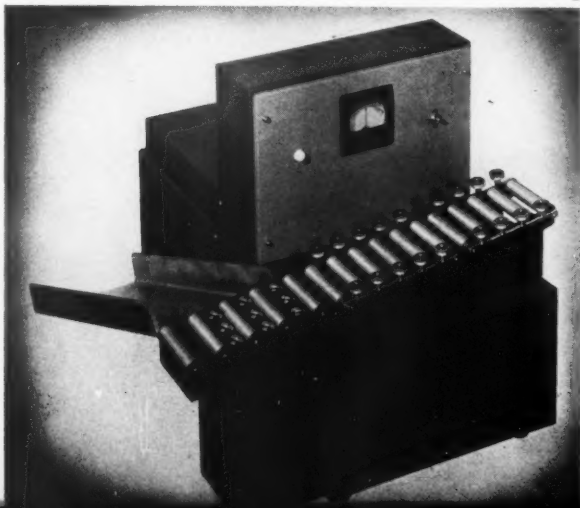
The material-labor ratio of many commodities makes it uneconomical to trim after packaging, and in such cases it is usually desirable to reject only the underweight packages. More costly commodities packaged volumetrically warrant hand trimming of overweight packages and usually are grouped into three classifications: underweight, correct weight and overweight. The tolerance limits regarded as incorrect weights are easily adjustable.

Volume outage detectors

Perhaps the simplest of checking devices—in principle, if not necessarily in construction—are the so-called outage detectors which are used to determine the level of fill of dry product cartons. These are of various types—straight line and rotary—all using the principle of the mechanical finger which is inserted into each package. Should the finger find itself able to descend further into the body of the package than a correct fill would permit, a mechanism is set in motion which throws the package off the line. Straight-line detectors are located at the delivery end of high-speed weighing machines and check packages as they leave these units. One type automatically stops the weighing machine if packages pass through which are not filled to the correct height. The machine operators then carefully examine the weighing unit and the trouble is located on the particular scale where the error has occurred.

Another straight line type utilizes a circular disc, set vertically above the packages on the conveyor line, with a series of pendulums or hanging members. This is set so that if the material is up to the desired height in the carton, a hanging member comes to rest on the top of the material and is pushed up slightly as the disc moves down. If, however, the material is below the desired height in the container, contact will not be made with the hanging member. Failure to make this contact permits a throw-out switch to operate, causing a pusher device to throw the faulty package out of the line.

2. Conveyor unit, coupled with automatic weigher, classifies articles by weight during process of packaging to facilitate speed in handling. Photo Exact Weight Scale Co.
3. Predetermined weight scale for packaging and check weighing. Over-and-under chart. Poise locks prevent movement during operation. Photo Toledo Scale Co.



2



3

Bottle Cleaning Equipment

TO prevent contamination of their products and to comply with food and health laws, manufacturers find it necessary to clean bottles prior to filling. Those using all new containers desire to remove lint, dust and any glass chips that may enter the container between the time of its manufacture and the time of its use in the packaging plant. Those using a returned bottle—as in the milk and beverage industries—of course find thorough washing and sterilizing of such containers an absolute essential. Cleaning equipment is of three general types: air cleaners, rinsing machines and soaking, rinsing and washing machines.

The two former types are recommended only for the thorough cleaning of new glassware not requiring sterilization at the point of filling. When second-hand or returned bottles are being used, only a thorough soaking and washing in sterilizing solutions, followed by a careful drying, can be recommended.

Air cleaning

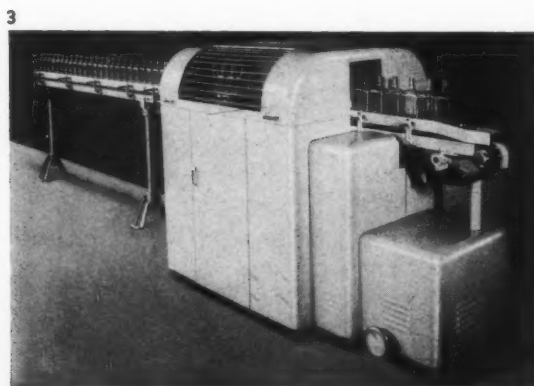
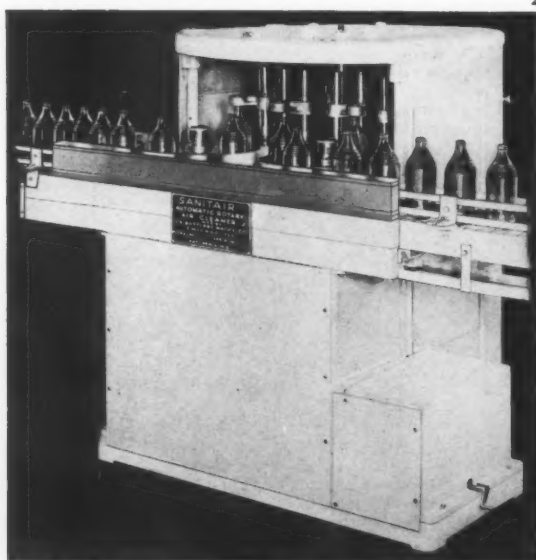
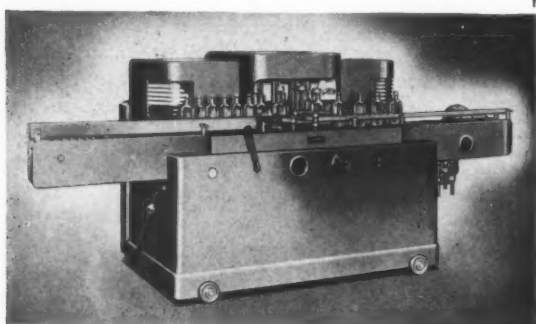
Where glassware comes directly from the factory, cleaning by compressed air has been found satisfactory in numerous plants, particularly provided the glassware has not been exposed—outside of closed shipping containers—to grime or grease.

Air cleaners of both hand-operated and automatic types are available. In the non-automatic type, the operator places two bottles at a time against air tubes, arranged to provide a blast of air whenever the pressure of the bottle necks is applied. From 60 to 80 lbs. of compressed air pressure is utilized and dirt, lint and grease are thus literally blown out of the bottle. Such machines can be operated at a speed of from 30 to 40 containers per minute, depending on the skill of the operator and the size of the container.

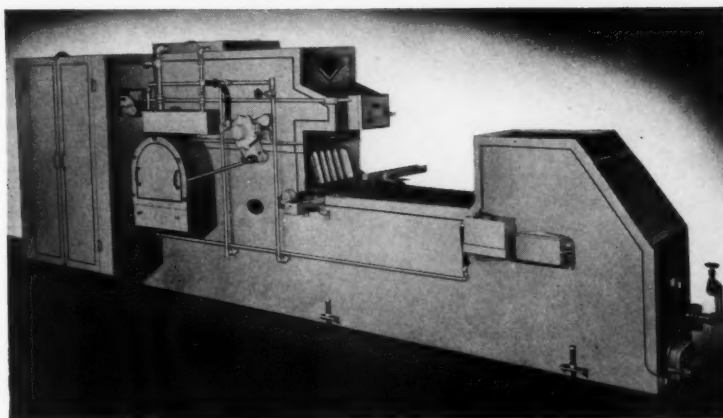
Automatic machines of various types are also available. In some instances, rotary machines very similar to bottle-filling machines are utilized, receiving the bottles directly from a conveyor and cleaning them while in upright position. They are discharged, one by one, back on to the conveyor, by means of a star wheel.

Another type takes bottles, inverts them for cleaning, replaces them, clean, in upright positions—all continuously—and discharges them by means of star wheel arrangement.

1. Automatic rotary bottle cleaner. Containers are inverted over air blast mechanism. Courtesy The Karl Kiefer Machine Co. 2. Automatic rotary air cleaner. Courtesy U. S. Bottlers Machinery Co. 3. Fully automatic straight line air cleaner. Bottles are inverted six at a time over cleaning heads. Courtesy Pneumatic Scale Corp., Ltd.



4. Five-wide automatic bottle washer. Soaking and washing machines are designed for the complicated cleansing problems of returned bottles, such as milk and beverage containers. Photo Courtesy Liquid Carbonic Corp.



Another type of machine receives a group of bottles from the conveyor on to a barrel-like holding device and then proceeds to invert these bottles over air nozzles. Cleaning is thus accomplished while the bottles are held in inverted position. While one set of bottles is being cleaned, the preceding set, at the opposite side of the drum, is being returned to the conveyor and a third set being received, immediately thereafter, by the drum.

Air cleaning equipment is sometimes incorporated as an integral part of a bottle-filling machine.

Bottle rinsers utilize a spray of water—sometimes heated and sometimes including sterilizing solutions, to rinse both the inside and the outside of inverted containers. Some of the rotary table type consist of a large number of spouts mounted on a rotary table. The operators invert bottles over these spouts which then pass under a hood where interior and exterior sprays are applied. Machines of essentially similar principle are also manufactured using a straight line conveyor or a

chain conveyor, designed to carry one or more rows of bottles through a rinsing hood where both interior and exterior rinsing is performed.

Soaking and washing machines

Soaking and washing machines were designed to meet the far more complicated cleaning problems involved in the use of multi-trip containers. Such containers frequently require the removal of an old, stained or torn label. They have often been used—while in the field—to hold products ranging from kerosene to fats. They have had opportunity to collect every sort of contamination—germs, dirt, grease and grime—and thus require the most effective form of thorough cleansing and sterilization.

Machines of this sort usually first rinse the bottle to flush out loose dirt, flies, etc., and to pre-heat the bottles for the high temperature solutions in the following processes. Soaking in hot alkali solutions then follows, to

5. Bottle rinsing, washing and drying machine. Note trays permitting use for wide range of bottle sizes. Courtesy U. S. Bottlers Machinery Co.



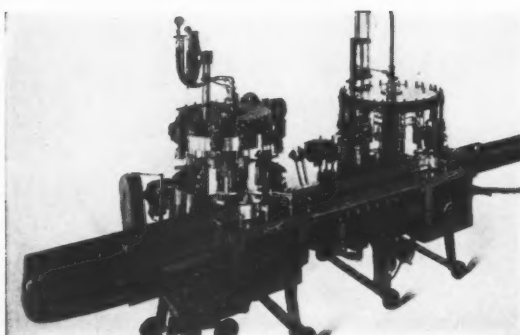


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remove effectively labels, adhesives and all forms of dirt deposits. Frequently brushing devices for both interior and exterior of bottles are included as an integral part of the machine. The final step consists of rinsing of both interior and exterior, to remove all cleaning solutions and then draining and, in some instances, drying.

Machines vary in size to meet varying production needs and use chain belts equipped to hold anywhere from one to twelve or more bottles per link. Feed and discharge may be automatic and directly off a conveyor, semi-automatic by means of a magazine feed or hand fed in some instances.

Production speeds vary with the width of the machine, i.e., the number of bottles held per link of chain or belt, and with the size and type of container. Thus an essentially identical machine designed with a four-bottle-wide belt will have a capacity of from 24 to 32 bottles per minute, whereas an eight-bottle-wide belt machine will have a capacity of from 48 to 64 bottles per minute.

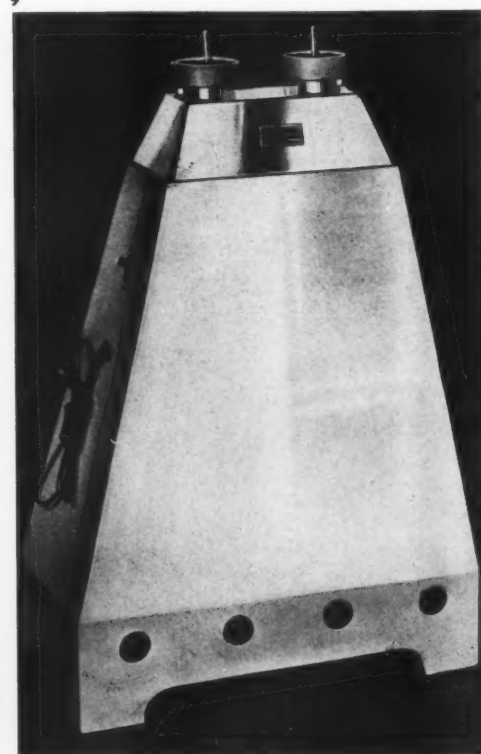


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6. Rotary bottle washing table. Bottles are placed on table and removed by hand. Courtesy F. J. Stokes Machine Co. 7. Rotary air cleaner used in conjunction with rotary vacuum bottle filler. Courtesy The Karl Kiefer Machine Co. 8. Automatic ampoule washer and sterilizer, utilizing rotary motion. Photo Courtesy The Lakso Co. 9. Two-tube air cleaner with compressor pump. Operator inverts bottles over air blast heads. Photo Courtesy U. S. Bottlers Machinery Co.



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Filling Liquids and Pastes

EQUIPMENT for the filling of containers with liquids or pastes can generally be divided into two broad general classifications:

1. Metering machines—which deliver to the container by:
 - (a) A measured volume.
 - (b) A measured weight.
2. Constant level machines—which fill the containers to a uniform height as measured from:
 - (a) The bottom of the container to the liquid level at the top.
 - (b) The top of the container to the liquid level.

Metering machines are used principally for viscous or semi-liquid products. The constant volume type consists basically of an accurate pump of either piston or rotary impellers and is obtainable as hand operated, semi-automatic or full automatic equipment.

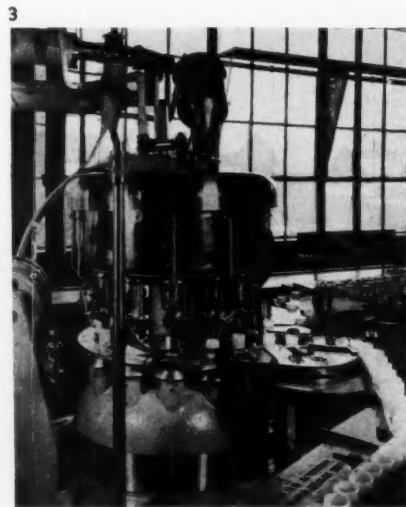
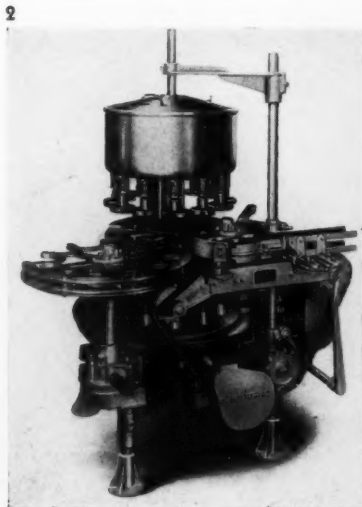
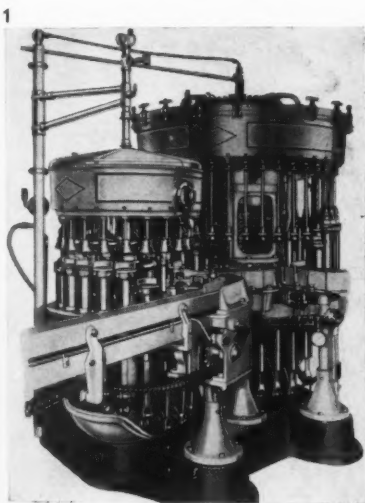
The hand operated units are generally constructed with a piston pump, a hopper in which is loaded a batch of the material to be filled and a spout to which the operator presents the containers in time with the stroke of the piston. On some products, it is necessary to keep the tip of the spout immersed in the fluid as it is ejected into the container, thus eliminating air pockets. In the hand operated machines, the operator is relied upon to lower the container away at the proper speed in order to accomplish this end.

Semi-automatic and full automatic machines of the piston type operate on a similar principle, except that two or more piston pumps are utilized along with a conveyor which intermittently carries the containers forward. A cam operated table raises the containers at the filling station and lowers them away in timed relationship with the piston stroke. The containers can be automatically discharged on to a conveyor for subsequent packaging operations.

Machines are also available of the full automatic constant motion rotary type. This type of equipment can be hand fed by an operator placing empty containers on the trays of the machine. This construction is usually recommended where there is a wide variety of shapes and sizes to be handled. These machines can also be automatically fed and are well adapted to conveyor line operation where there are previous and subsequent operations to be performed. For this purpose, a star wheel is utilized and the containers are removed from the conveyor thereby and automatically returned to the conveyor after the filling operation has been completed.

There are two general constructions of the rotary type machine. In one there is a series of piston pumps mounted above and rotating with the containers, so that each stroke of a piston fills the container below it. In the other there is a pump of the rotary impeller or piston type, depending upon the product to be handled, and a valve head arranged so that the entire discharge

1. Forty-spout liquid low pressure filler with twenty-spout syruper attachment. This equipment is generally used in the soft drink field. Photo Liquid Carbonic Corp. 2. Twelve-valve automatic rotary filler, gravity type, for soups, syrups, fruit juices and saucing of beans, etc., in open top cans. Photo Horix Mfg. Co. 3. Predetermined level filler for free flowing products. Fills to a pre-set point in container. Photo Food Machinery Corp.



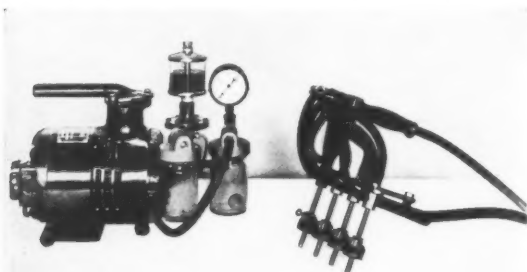
from the pump is ejected into one, and only one, container at a time. In recent years, this type of equipment has been greatly improved so as to give greater speed, cleaner filling and a wide capacity range with minimum changeover time. There have also been added no jar—no fill and other safety devices, so as to render the equipment fool-proof. The rotary impeller pump has the distinct advantage of a constant velocity of material flowing through it in one direction, so as to minimize its wear and thereby indefinitely hold its accuracy.

Constant weight measuring equipment contains a scale as an integral part of the machine. As the container is filled to a point where it is equally as heavy as a pre-

determined weight placed on the other platform, the balancing of the scale causes the filling valve to be tripped and the flow then stopped. These units are principally of the hand operated type and generally give no greater speed than an operator can obtain with a hose with nozzle-valve, but offer the distinct advantage of clean and accurate filling.

The constant level equipment is principally used for light, free-flowing liquids. The siphon filler was the earliest design in this category and is still used for some hand operated units. In these machines, the container is filled until the liquid level therein is the same as that in the float controlled supply tank. There is no overflow to be handled with this method.

Direct pressure machines require that the neck of the container be sealed, usually with a rubber stopper through which passes the filling stem. This stem contains both liquid and air passages so that, as the product flows through under a gravity head pressure which may vary between three and fifteen feet, the air is permitted to escape. When the container is filled, the air escapes by the passage provided in the filling tube, the liquid then begins flowing out through that passage, but, since the opening is small, it runs at a greatly reduced speed. This type of equipment is faster than the siphon units and is obtainable in all sizes from hand operated to full automatic.

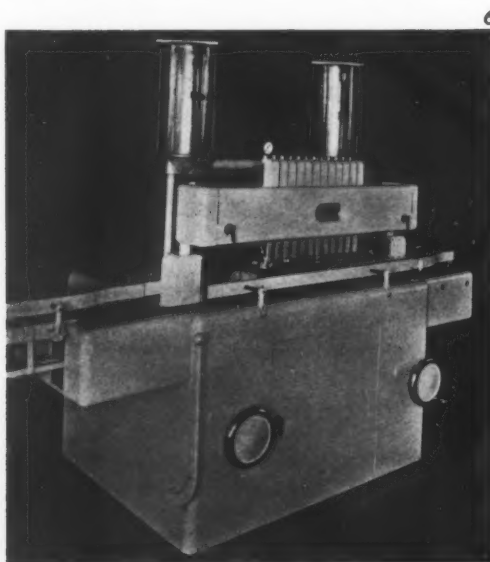


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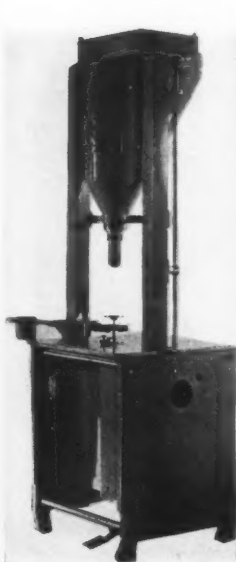


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4. Portable vacuum type filler equipped with four-valve filling heads. Photo Horix Mfg. Co. 5. Gravity type liquid filler with eight filling spouts. Photo Scientific Filter Co. 6. Automatic vacuum filler for bottles and cans; equipped with variable speed drive permitting adjustment of speed to other machines in the line. Photo Pneumatic Scale Corp., Ltd. 7. Augur fed filler for pastes and viscous materials. Takes container up to 18 in. in height. Photo Stokes & Smith Co. 8. General purpose filler for thick liquids and pastes. Photo F. J. Stokes Machine Co.



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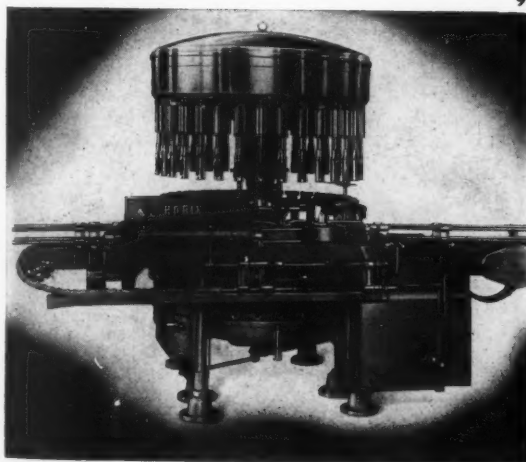
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Drip and the filling of defective containers can be prevented by the use of a variant of the direct pressure construction known as the "gravity vacuum." In this design the supply tank, mounted above the filling tubes, is kept under vacuum, so that vacuum must be created in the container before the liquid can be permitted to flow into it by gravity.

In full automatic equipment, the straight vacuum, the gravity-vacuum and gravity principles are frequently used. In the vacuum construction, the float controlled supply tank is mounted below the filling tubes. The containers are sealed, as in the direct pressure units, and the air withdrawn from them. The reduced pressure thus produced causes the liquid to be drawn into the containers, the overflow going out through the air tubes just as in the pressure machines. The liquid is separated from the air by an automatic trap, the liquid being returned to the supply tank and the air going out through the vacuum pump. These machines are available in all sizes from hand operated units to completely automatic.

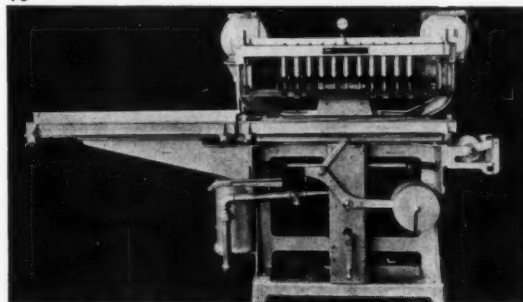
Into full automatic liquid filling equipment there have been incorporated, in the last few years, many safety devices which make for smooth, top speed operation with a minimum of stoppage. Machines have devices guaranteeing protection against damages otherwise resulting from carelessness on the part of the operator or from choke-neck or misshapen containers or even the stopping of other machines in the line.

9. Thirty-two valve automatic feed and discharge rotary filler. Photo Horix Mfg. Co. 10. Semi-automatic vacuum filler for bottles and cans. Photo Pneumatic Scale Corp., Ltd. 11. Multi-head paste filler for hot and cold semi-plastic products. Photo The Vol-U-Meter Co. 12. Straightline semi-automatic vacuum filler. Photo U. S. Bottlers Machinery Co.

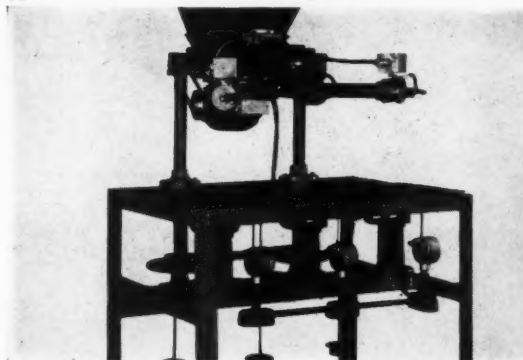


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Capping and Sealing Equipment

MACHINES are available for applying screw caps, crowns, corks and vacuum caps to containers at varying rates of speeds and under a wide range of differing operating conditions. Such machinery varies from the simplest hand cappers to high-speed fully automatic equipment, operating on conveyor lines in conjunction with filling and labeling and cartoning machines.

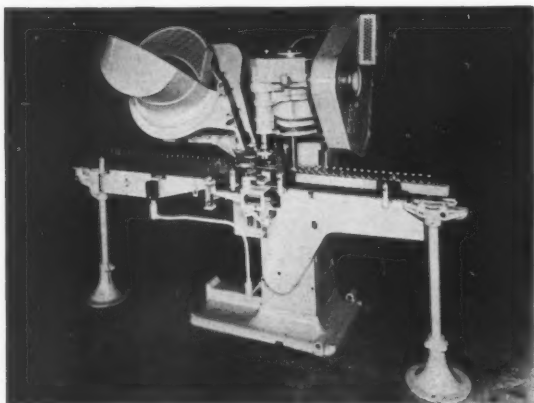
Screw and turn-on caps

The application of the screw cap closure is not as difficult a problem as it at first appears. When the cap is properly designed so that the lead threads readily follow the thread on the glass, thus preventing any

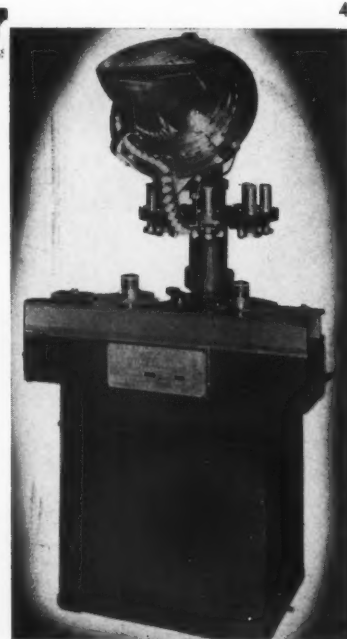
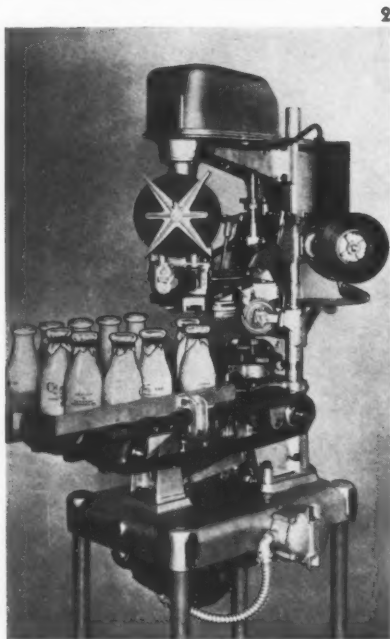
tendency to cross thread, and the liners are glued into the cap or attached in a satisfactory manner so as to prevent their falling out of the cap, it is possible to employ automatic equipment in applying these closures.

There are several types of machines available for applying turn-on caps. On some of these it is only necessary to dump the caps in a hopper, from where they are systematically sorted and fed to the machine in relative coordination with containers received from the filler. On others, generally referred to as semi-automatic cappers, it is necessary to start the cap on the container. Regardless of the type machine employed, the caps must be applied with the proper tension so that a perfect seal is made both with the top of the bottle and the cap liner.

Hand-capping machines are, in many cases, used where production requirements are so small that the tendency is to continue with the old hand operation. For those manufacturers whose requirements are small, the adoption of at least a hand-tightening unit is recommended. This unit can be adjusted so that every cap



1. Single-head full automatic capper. Photo Pneumatic Scale Corp., Ltd. 2. Milk bottle hooding machine; forms, applies and heat-seals protective caps from cellophane roll. Photo Package Machinery Co. 3. Ten-head rotary crowner for carbonated beverages. Photo Liquid Carbonic Corp. 4. Full automatic rotary corker for flanged corks. Photo U. S. Bottlers Machinery Co.



Exact Weight Scales for Speed & Accuracy in Packaging

PRODUCTS—Quality pre-determined weight scales for modern packaging; checkweighing, controlling automatics, hand weighing.

EXACT WEIGHT Scales are the acknowledged leaders in the pre-determined weighing field. More than 50,000 corporations and companies in 53 industries from coast to coast use this equipment for checkweighing, controlling automatics and hand weighing on every type of production line in modern packaging.



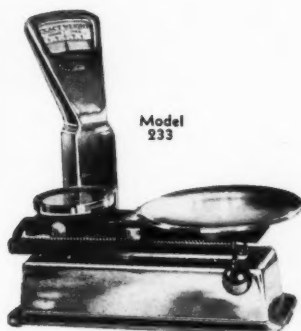
SHADOWGRAPH

The **SHADOWGRAPH** is a revolutionary advance in precision weighing. A light ray replaces mechanical indication to allow reduction in working parts thus producing greater accuracy and speed. Noiseless in operation—instantly ready to weigh by plugging into any electrical outlet. Featuring extremely fine sensitivity **SHADOWGRAPH** is dependable and accurate in any high speed modern packaging operation.

Model 1021 (below) is designed for carton, box and can packaging and weighing. Ideal for candy, lard, broken eggs or any product packaged to exact weight. Equipped with a top reading dial for floor or low bench operation. It requires no leveling for uneven floors. Comes with carrying handles for easy transportation in the plant. Accurate to $\frac{1}{4}$ oz.—Capacity to 53 lbs.



Model 1021



Model 233

Model 233—Features Tu-way tower and backset dial with slant tower indication; combines accuracy and speed performance for checking automatic machinery; extremely short platter fall ($\frac{1}{8}$ ") which cuts scale depreciation. Accurate to $\frac{1}{8}$ oz.—Capacity to 3 lbs.



Model 8003

Model 8003—The **COLUMBUS**, a general purpose scale furnished in white porcelain enamel or Nile blue as preferred. Features center tower construction with indicator travel of one inch to one ounce . . . thereby removing the last excuse for inaccuracy in all checkweighing operations. Accurate to $\frac{1}{8}$ oz.—Capacity to 12 lbs.



Model 273

Model 273—End tower construction completely changes all standards by which modern high speed over and under weight scales are to be judged. Features—Short platter fall which multiplies operating speed and this feature materially reduces scale depreciation—compactness—less space on the bench—fits any production line—uninterrupted straight line production across the scale—heavier construction for added ruggedness. Accurate to $\frac{1}{8}$ oz.—Capacity 12 lbs.



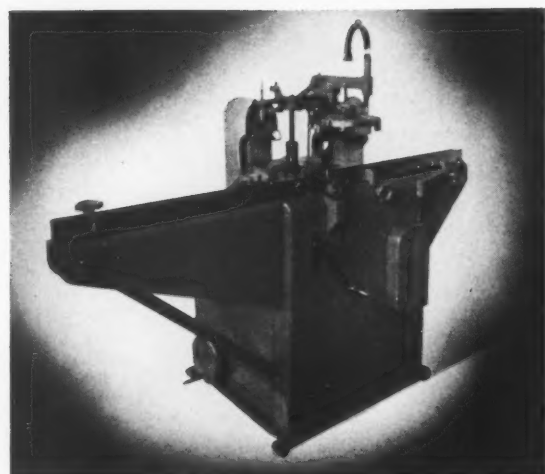
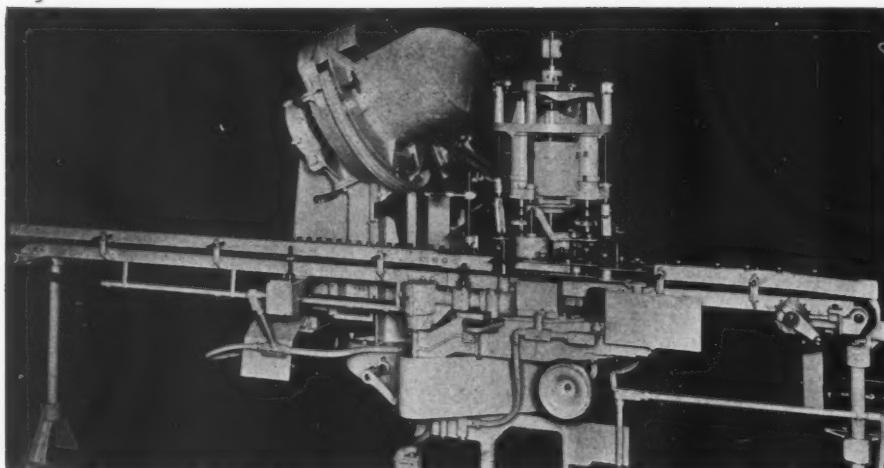
Model 1120

Model 1120—Features tower inclined at angle of 30 degrees—revolves to face any direction required by the operation. For heavy duty packaging . . . checkweighing. Rugged . . . built to stand hard abuse, yet light in weight (130 lbs.). Equipped with carrying handle on each side; low weighing platform ($6\frac{1}{2}$ " from floor). Aluminum platform 17" x 12"; open construction to permit easy cleaning. Accurate to $\frac{1}{4}$ oz. at full weighing capacity—Capacity to 150 lbs.

THE EXACT WEIGHT SCALE CO.
223 W. Fifth Ave. Columbus, Ohio



THERE IS NO SUBSTITUTE FOR EXACT WEIGHT
**INDUSTRIAL
PRECISION SCALES**



5. Four-head fully automatic rotary capper. Photo Pneumatic Scale Corp., Ltd. 6. Semi-automatic hand-operated screw capping machine. Photo Scientific Filter Co. 7. Automatic cottoner for inserting wadding into pill bottles. Photo The Lakso Co.

will be applied to the proper tension in order to insure a proper seal and still be easily removable by hand.

Semi-automatic machines are of the same general construction and size as the fully automatic. The cap-feeding device, however, is omitted and the cap started on the container by hand. It is installed in the production line the same as the fully automatic and occupies the same space as the automatic machine. It has a feed conveyor and a discharge conveyor and the containers are fed and discharged automatically.

The smallest semi-automatic machine is generally a single-head machine designed for operating at capacities from 1800 per hour to about 2700 per hour. In order to obtain a larger capacity, it is necessary to employ a machine using a number of spindles rather than a single head. These units are designed to possess a capacity of from approximately 50 containers per minute to 120 or more. They are usually of the rotary type and are in practically all cases the same machine as the fully automatic, except for the omission of the automatic cap-feeding and applying mechanism.

Another variation of the semi-automatic capper is the type which uses a belt cap feed on to which the operator

simply feeds the caps. From that point on, operation is completely automatic. This method is often used where closures are not suited to automatic sorting and feeding.

The semi-automatic unit can be readily changed from one size container and cap to another and the cost of attachments for the different containers is not exceedingly high. On the fully automatic machine, a change from one size cap and container to another requires a longer period of time and the attachments, of course, are much more costly.

Fully automatic machines, when it comes to larger capacities, or outputs, are sometimes found to be far more desirable inasmuch as their greater efficiency will considerably reduce packaging production costs.

Automatic units are most profitably adapted to those production lines operating at a capacity of 45 or more containers per minute. There are, however, many instances where a steady production of 35 to 40 containers per minute is needed and sizes are suited to automatic production. In such cases, a full automatic single head or slow speed multiple head unit may be desirable.

A recent development replaces the familiar hopper with a worm feed device. Since this eliminates the necessity of agitating and jumbling large masses of caps in a hopper, it permits the handling of delicate types which could not previously be handled automatically and particularly those closure types where the height exceeds the diameter.

Crowns and corks

When plain or flanged corks are used, the capping problem resolves itself into one of inserting the cork into the neck, rather than turning a thread. Such insertion is, in the vast majority of cases, done in part or

"Start to Finish" BOTTLING SERVICE for BOTTLES - CANS - JARS

Pneumatic is the one machine builder offering a full line of cleaning, filling, capping and labeling machines designed to operate as individual units or in complete co-ordinated hook-ups.

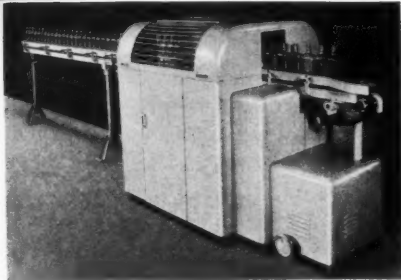
CLEANING



Pneumatic's Inverted Air Cleaners assure thorough cleaning of new glassware. Containers while inverted are subjected to a blast of clean, dry air which completely removes all foreign matter.

At Left—SEMI-AUTOMATIC INVERTED BOTTLE AIR CLEANER: Attendant holds two containers simultaneously and in one motion inverts them, thrusting the necks in the direction of the self-centering nozzle seal, where the air blast is received. Machine will handle a wide variety of bottle shapes and sizes at speeds ranging from 20 to 50 per minute.

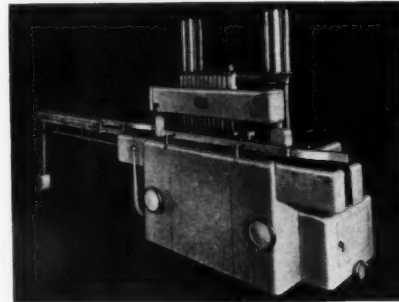
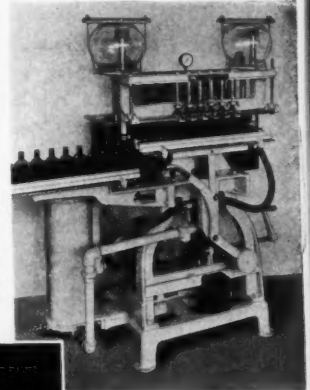
At Right — AUTOMATIC INVERTED BOTTLE AIR CLEANER: A fully automatic machine similar in operating principle to the Semi-automatic Cleaner. Will handle 3 oz. to 32 oz. bottles, jars or jugs at speeds up to 120 per minute.



FILLING

Illustrated are two of Pneumatic's several vacuum filling machine models for accurate filling of bottles, jugs, cans, and jars at speeds ranging from 20 to 120 per minute.

At Right—SAMCO JUNIOR VACUUM FILLER: For free-flowing or semi-free-flowing liquids in 1 oz. to 1 gal. cans, regular finish or AGST glassware. Parts change takes less than 15 minutes, therefore machine is particularly suited for short runs on a variety of products and container sizes at speeds up to 40 per minute.

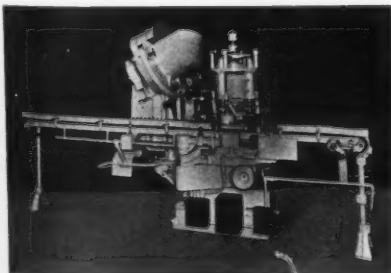
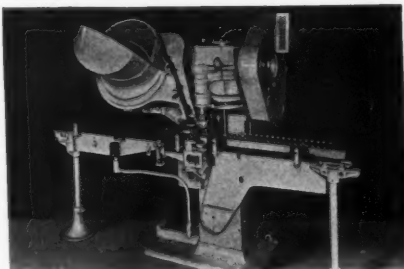


At Left—AUTOMATIC SAMCO VACUUM FILLER: Equipped with standard 12-heads this fully automatic machine is capable of speeds of 50/70 per minute on 1 oz. to 1 qt. sizes. Double bowl overflow system, high speed filling nozzles and quick size changes insure rapid dripless filling of free flowing or semi-free flowing liquids.

CAPPING

The flexibility of Pneumatic's Single-Head, Two-Head and Four-Head capping machine models makes handling of a wide size range entirely practical and relatively simple.

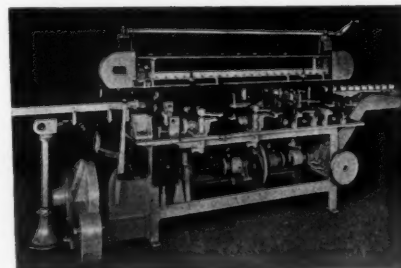
At Right—SINGLE HEAD CAPPER: Will sort, feed and apply any type of molded or metal turn-on closure to containers ranging from 1 oz. to 1 qt. at speeds up to 50 per minute. Machine is entirely automatic and requires less than 15 minutes for size change.



At Left—PNEU ROTARY CAPPER: A hi speed capping machine for handling a variety of sizes and shapes of bottles, cans, and jars at speeds up to 120 per minute.

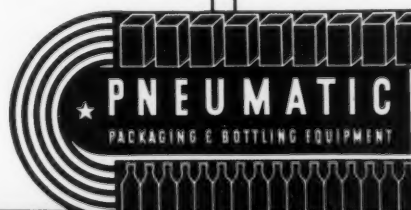
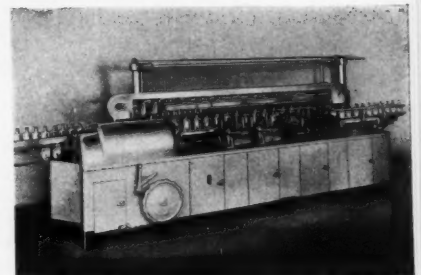
Pneumatic's Simplex and Duplex Labelers safeguard the appearance of your containers by assuring precise, accurate register—dependable labeling at speeds up to 120 per minute.

LABELING



At Left—SIMPLEX LABELER: One of several models for applying front only, front and back, two front and one back, or partial wrap-around labels to bottles, cans, and jars. Machine is fully automatic and can be changed from one size to another in less than 10 minutes.

At Right—DUPLEX LABELER: Will apply front only, or front and back labels to containers ranging in size from 1/2 pt. to quarts at speeds up to 120 per minute.



PNEUMATIC SCALE CORP., LTD., 77 Newport Ave., North Quincy, Mass.

in whole by hand. The most familiar mechanical aid is the corking wheel conveyor, which consists of a section of belt conveyor with a wheel of fairly large diameter suspended above it at the height of the bottle top. Operators start the corks as the containers pass down the forepart of the conveyor and the movement of the belt then forces the bottles, one by one, under the corking wheel. Thus a gradual and increasing pressure is applied to each cork in turn, forcing it into position.

Another type of corker substitutes an endless belt, running over two pulleys, for the corking wheel. A rigid metal plate behind the slanting lower portion of the moving belt forces the corks firmly and evenly into the neck of the containers.

Crown caps are frequently applied by equipment forming an integral part of bottle filling machines. However,

separate rotary crowners of fully automatic type are available. These are very similar, in feed and general structure, to rotary turn-on closure cappers, except that they substitute a crown forming pressure for the turning action of the ordinary capper.

Hand and semi-automatic devices for applying crown caps, milk bottle caps, foil and paper hoods for milk bottles and many other specialized types of closure or super closure are also available. The basic principle of application varies very little, however, from those described in the foregoing discussion.

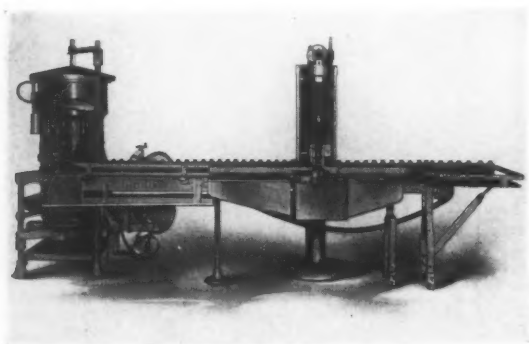
So-called roll-on caps are applied by rotary automatic machines which position the unthreaded cap on the bottle and hold it thus while revolving rollers form the cap metal to the shape of the bottle thread.

Fully automatic corking units have been devised recently for a number of special applications. In one such machine, corks are placed into correct position in the corking head for driving into the bottle neck by a positive air pressure feeding device. Corks are hopper fed into a channel that directs each cork to the correct position and register before insertion in the bottle neck. The large capacity hopper is so designed that a casual glance from the line operator will determine just when a new batch of corks is required.

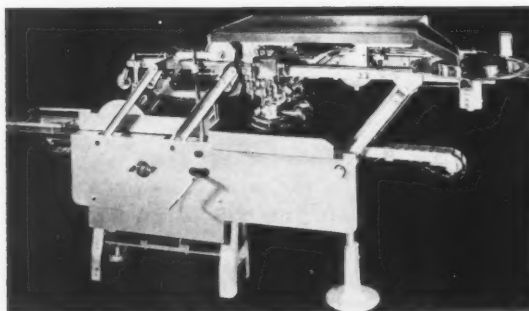
Feeding of the filled but uncorked bottles into the machine is controlled by an electric feed switch. The machine is so designed as to automatically stop whenever a "break" appears in the line of advancing bottles and to remain stopped until the break is closed. The machine is equipped with a vari-drive, making possible its operation at exactly the speed called for by the production schedule and its synchronization with the other units of a packaging line.

Vacuum sealing

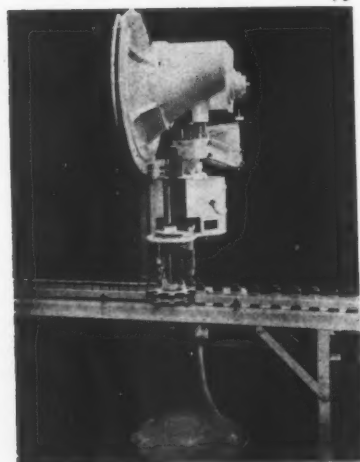
In general, the result of the use of vacuum is that the action of oxygen as a destructive agent is retarded to a point where, for all practical purposes, it is non-existent. These advantages may be summed up as follows:



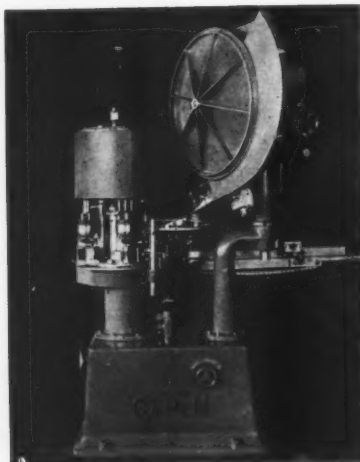
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8. Semi-automatic screw capper coupled with hand fed automatic discharge rotary bottle filler. Photo Horix Mfg. Co. 9. Adjustable vacuum-pry-off cap sealing machine for jars from 3 to 12 in. high and 1 to 8 in. in diameter. Photo Crown Cork and Seal Co. 10. Fully automatic capper designed to sort, feed and apply square cover assembly to can bodies. 11. Full automatic four spindle rotary capper. Photos 10, 11, Consolidated Packaging Machinery Corp.



TAKE A PEEK...



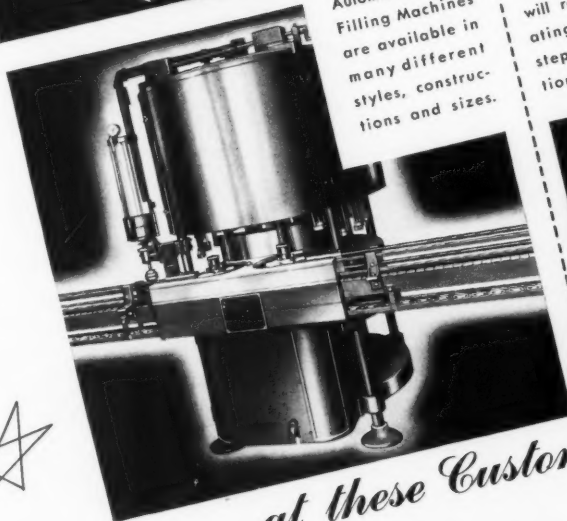
The U. S. Multiple Disc Drum Filter does an excellent job of filtering a wide variety of products.

Automatic Rotary Filling Machines are available in many different styles, constructions and sizes.



The Sanitair Rotary Automatic Air Cleaner, the most efficient method for air cleaning new containers.

U. S. Automatic Rotary Cappers will reduce operating costs and step up production efficiency.



at these Custom Built Machines

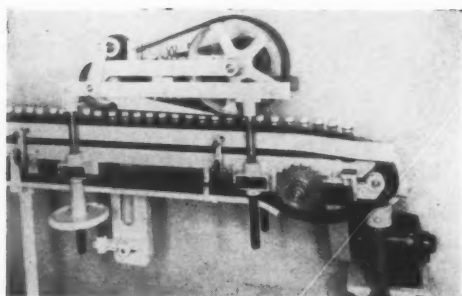
U. S. BOTTLERS

Machinery Co.

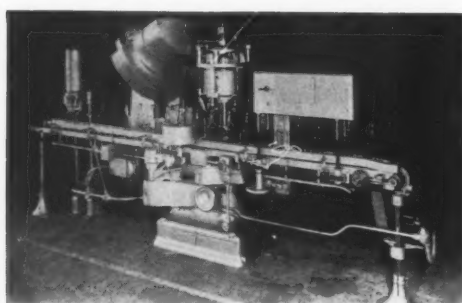
4032 N. ROCKWELL ST., CHICAGO

MANUFACTURERS OF

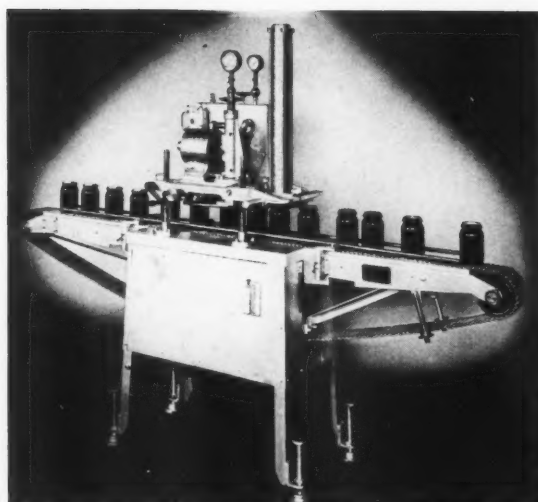
PUMPS
CAPPERS
FILTERS
CONVEYORS
WASHERS & DRYERS
WASHERS
CORKERS
FILLERS



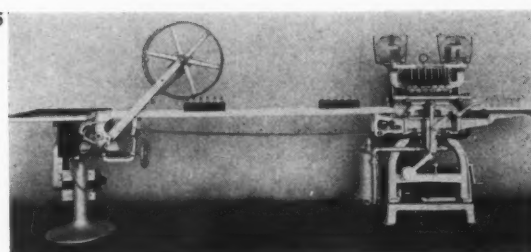
12



13



14



15

12. Cork depressing device operated on conveyor line. 13. Combined capper and corker for applying screw caps and depressing corks. 14. Automatic straight-line high-speed model, steam vacuum capping machine. Photo Anchor-Hocking Glass Corp. 15. Corking wheel unit on discharge conveyor of filling machine. Photos 12, 13, 15, Pneumatic Scale Corp. Ltd.

1. The prevention of rancidity of oils and fats contained in food products. Even though this deterioration may take effect slowly, it is difficult to foresee how long a package may remain on a dealer's shelf and even slight rancidity is enough to affect flavor adversely.
2. The elimination of discoloration due to oxidation. No product that is "off color" is either appetizing or saleable.
3. The preservation of delicate flavors and aromas. This is particularly true where a mechanical vacuum is used.
4. The retarding and practical elimination of the growth of mold and yeast. The rapid multiplication of these micro-organisms is dependent on the presence of air.
5. The effective reduction of the corrosive action of acids and other chemical properties of food products. Corrosion is a process of oxidation and hence is effectively stopped by the decrease of oxygen content of the package through the use of a vacuum.

In general, there are two types of sealing machines for the application of metal caps under vacuum-mechanical and steam. In the mechanical type, there are two styles. One effects a vacuum seal by means of a vacuum pump and the other creates a vacuum by means of a piston arrangement built in the machine itself.

Mechanical vacuum types of sealing machines are available in a variety of styles, ranging from the simple, hand-fed types to the completely automatic styles. These machines are designed to apply caps, under vacuum, to jars, tumblers and bottles.

The development of vacuum by the displacement of air with steam provides a unique and highly important characteristic in that the vacuum is formed after the closure has been applied, thus preventing the sucking out of a cold packed product from the container or the boiling over of a hot packed product. Mechanically, the steam vacuum system is simple. No vacuum pumps are used. All that is required to successfully operate the system and the capping machine are a steam supply and electrical current.

While the primary purpose of the steam is to displace the air from the head space, it also serves a secondary function in that it sterilizes the cap and creates a sterile atmosphere for the capping operation. In general, the speed of the machine may be adjusted to the convenience of the packer and the machine can be set into packing conveyor lines. Most varieties are readily adjustable for differing sizes and styles of jars or tumblers and for varying sizes of closure. Regulation of the degree of vacuum—with the steam types—can be governed by the amount and temperature of the steam atmosphere. With the mechanical types, such regulation is effected by adjustments of the pump controls.



The Packaging Industry as a whole has gone "all out" for the war effort. Not only is it supplying critical demands for standard packaging equipment, but almost without exception it has converted its plants to produce various types of special machinery needed by our Armed Forces.

Here at Consolidated, greatly enlarged facilities are operating 24 hours a day. Practically all of this capacity is devoted to the manufacture of special equipment for the U. S. Ordnance Department. The balance is supplying standard Consolidated equipment to those equally vital industries who are able to secure satisfactory preference ratings.

Thru all the smoke and confusion of war we clearly recognize our responsibilities to users of packaging equipment. With this in mind, Consolidated research goes on. New materials are being tested—new processes studied, new designs worked out. So, when the time comes, there will be Consolidated equipment ready to help—whether it be a matter of converting back to former packaging practice or more efficiently equipping industry to meet new trends.

Consolidated plans for TOMORROW while straining every sinew producing for TODAY.

Consolidated

PACKAGING MACHINERY CORP.
 1400 WEST AVENUE BUFFALO, N.Y.

Labeling Machines and Devices

BROADLY speaking, there are four different methods which underlie the principles used in the design of modern labeling machines.

(1) Adhesive is applied to "pickers" which in turn carry the label from the bottom of a hopper to the package. The label is clamped to the package by grip fingers; the pickers detach themselves from the label and then pressure is applied either by flexible wipers or by press wipers so that the adhesive which remains on the label from the pickers causes the label to be attached to the wall of the package.

(2) Adhesive is applied to a rubber pad. This pad is brought in contact with the package and then the label in turn is brought in contact with the adhesive-covered surface of the package, after which pressure is applied by wipers to form the union.

(3) The label is fed by pneumatic means from a hopper, passed over an opening where a spraying apparatus applies the adhesive. By the same pneumatic means, the label is then carried to the package and applied. Pressure is exerted to complete the attaching.

(4) The label is fed from a hopper by means of a pneumatic platen, which rigidly holds the label over its entire surface in a flat condition and carried tangentially over a twin roller gumming mechanism where a uniform film of adhesive is rolled on to the label. By the same pneumatic means, it is carried and attached to the article, after which pressure is applied to insure firm adhesion.

As is natural with almost all mechanization, the modern labeler is offered in both semi-automatic and fully automatic models, the difference being broadly as to whether the package is brought to the applying station manually or mechanically.

Methods 1 and 4, mentioned before, are employed for semi-automatic or hand-fed machines, whereas all four methods are used in the automatic labelers.

Semi-automatic or hand-fed labelers on the market today are capable of offering the user capacities from

30 to 60 labels per minute. The production, however, must of necessity depend on the article itself, on the dexterity and application of the operator and the plant management in bringing the articles to, and carrying them away from, the machine. In the majority of cases, this is done by conveyors running in front of (but not interfering with) the operator, or alongside of the attendant. Inspection and packing should be done immediately after the operator removes the labeled article from the machine and, in the choice of the labeler, this feature should be strongly considered so as to eliminate unnecessary and costly handling charges. Some labeling machines have an extremely wide range of adjustability, being capable of handling and affixing labels from the size of postage stamps up to labels or panels 6½ in. sq.

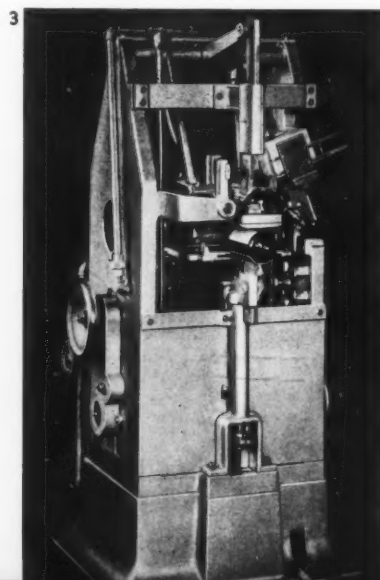
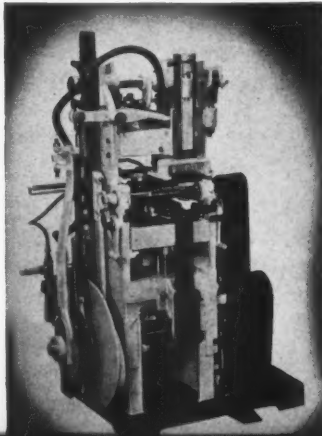
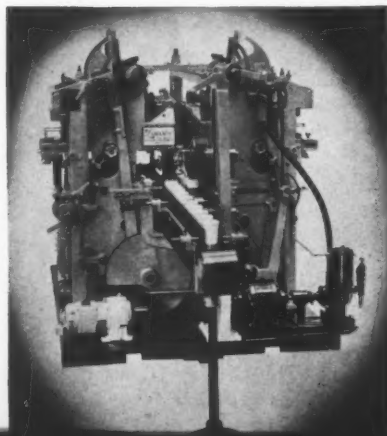
There are semi-automatics on the market capable of applying more than one label onto the package at one time and applying the foil onto the neck of the bottle, as used in the "soft" drink industry. They are capable of handling articles which the larger and faster fully automatic machines could not be capable of, such as delicate perfume vials, serum tubes and other highly fragile articles, also the handling of such items as cartridge fuses and battery tubes.

The labeling of paper boxes with paper or paper-backed foil labels or heavily embossed metallic seals, the manufacture of greeting cards, calendars, photomounts, the labeling of cigar boxes, wooden articles, attaching of paper handles to drinking cups, certain types of transparent material to folding box windows, etc., can be accomplished by some of these semi-automatic models.

Automatic labelers can be segregated into three divisions: (1) the rotary type, (2) the straight-line type and (3) the straight-line multiple type.

The rotary type of fully automatic labeler uses method No. 1 and method No. 4 for the application of the label and, as mentioned under the semi-automatic heading, it is also capable of applying two or more

1. Fully automatic duplex labeler applies front and back labels simultaneously. 2. Hand-fed semi-automatic labeler foot control. Photos New Jersey Machine Corp. 3. Hand-fed semi-automatic labeler. Photo Economic Machinery Co.



**DO WE NEED
A SMALLER PACKAGE**

A.—For a new product or for a new sales territory, the paper packet affords change of package content. The smaller sales unit is also adapted to rationing.

**DO WE NEED REFILLS FOR
OUR REGULAR PACKAGE**

A.—Paper packets provide convenient refills for containers of expensive or scarce materials and encourage users to continue purchase of product. Brown-made packets are sealed against sifting.

**DO WE NEED
NEW MARKETS**

A.—Paper packets, conveniently carried in purse or pocket, promise the patronage of the traveling public including factory and office workers, hotel and private guests, and other transients.

**DO WE NEED MORE
MERCHANDISING APPEAL**

A.—Paper packets promote correct product use with prescribed dosages and recipe exact, measured units; more frequent use with immediately usable, individual portions.

**DO WE NEED
MORE SALES VOLUME**

A.—Paper packets gain distribution in wider variety of outlets. Their pick-up sales are to all classes. As smaller sales unit and extra profit maker, packet wins counter display.

**SHOULD WE SAMPLE
OUR PRODUCT IN PACKETS**

A.—B. B. F. M. Co. is sampling headquarters for many prominent concerns whom it has served for years. Sampling is periodically used as sales promotion. Reasonable rates prevail for long or short runs.

**SHOULD WE USE
BROWN-MADE PACKETS**

A.—B. B. F. M. Co. designs and prints its own packets in one or more colors using white, manila, kraft, glassine, etc., stock. Accurately die cut and sealed against sifting.

**CAN WE TRY
BEFORE WE BUY**

A.—Yes, in two ways. B. B. F. M. Co. maintains a filling service. Bulk quantities of materials are packeted and distributed as you direct. Or, accept offer, below, of free test.

Eight problems—one solution

**for
food, drug
chemical,
cosmetic toilet
and other preparations**



MODEL
PF-100

Free Test

Send to us a quantity of your product or material for production tests. State quantity filling per packet. You get filled specimen packets and report. No obligation.

BROWN Automatic filling and sealing
for powders, granules, crystals

THE BROWN BAG FILLING MACHINE COMPANY • FITCHBURG • MASS.



MATERIAL: Powders, granular products, pastes **1**

CAPACITY: $\frac{1}{2}$ oz. to 5 lbs. — any container

PRODUCTION: 15 to 30 per minute

OPERATORS: One

Filling by gross weight, volumetric measurement or packing.

Write for literature on . . .

UNIVERSAL FILLER



MATERIAL: Powders, granular products, pastes **2**

CAPACITY: $\frac{1}{2}$ oz. to 15 lbs. — any container


PRODUCTION: 10 to 20 per minute

OPERATORS: One

Filling by gross weight, volumetric measurement or packing.

Write for literature on . . .

HEAVY DUTY FILLER



MATERIAL: Powders and granular products **3**

CAPACITY: 1 oz. to 5 lbs. — cans, boxes, canisters

PRODUCTION: 20 to 120 per minute

OPERATORS: One

Filling by gross weight, volumetric measurement, or combination of both.

Write for literature on . . .

AUTOMATIC DOUBLE UNIT FILLER



MATERIAL: Salted nuts, candies, small crackers, powders, and individual pieces **4**

CAPACITY: $\frac{1}{4}$ oz. to 1 lb. Cellophane, Pliofilm or other heat sealing material

PRODUCTION: 50 to 60 per minute

OPERATORS: One

Filling by measurement or by auger.

Write for literature on . . .

TRANSWRAP PACKAGING MACHINE



**IF YOUR
PROBLEM**



STOKE & SMITH
FRANKFORD PHILADELPHIA

PACKAGING IS . . .



STOKES & SMITH CO.
FRANKFORD PHILADELPHIA

5 MATERIAL: Nuts in shells, hard candies, flaked products

CAPACITY: 4 oz. to 1½ lbs. 220 cubic inches

PRODUCTION: 15 to 25 per minute

OPERATORS: One

Filling by net weight.

Write for literature on . . .



S&S CONVEYOR NET WEIGHT SCALE

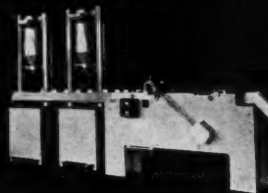
6 MATERIAL: Powders, cereals, seeds, chemicals, etc.

CAPACITY: Envelopes 2" to 8" high, when closed

PRODUCTION: 60 to 120 per minute

OPERATORS: None.
Entirely automatic.
Connects with and seals filled envelopes from powder filler or net weight scale.

Write for literature on . . .



S&S BAG AND ENVELOPE SEALER

7 MATERIAL: All food and grocery products in cartons

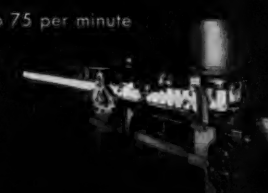
CAPACITY: Maximum carton: 10½" x 6½" x 4½"
Minimum carton: 2¾" x 1½" x ¾"

PRODUCTION: 40 to 75 per minute

OPERATORS: One

Several Models.
Feeds cartons,
bottom seals, fills,
top seals.

Write for literature on . . .



S&S NEVERSTOP CARTON FILLER & SEALER

8 MATERIAL: All food and grocery products

CAPACITY: Maximum carton: 10" x 6½" x 4"
Minimum carton: 3¾" x 1½" x 1"

PRODUCTION: 60 to 70 per minute

OPERATORS: One

Automatically tight-wraps carton with printed label, after it is filled and sealed, making attractive, siftless tight-wrapped package for all products.

Write for literature on . . .



S&S AUTOMATIC TIGHT WRAPPER

labels simultaneously, together with the foil neckband if desired. Consequently, it is particularly adaptable wherever round bottles, irrespective of their size, are used.

The bottles are taken from a conveyor by means of a star wheel or similar mechanism and timed through the machine. They are automatically ejected onto a conveyor and led away from the equipment to be inspected, packed or stored. They can attain speeds of 60 to 200 per minute.

The straight-line type, being of more recent design, can be used more universally as its construction allows a wider latitude in the shape of the containers and greater accuracy in the "spotting" of the label. All four methods described above are used in the feeding and attaching of the labels. Further, their design allows the adhering of front and back labels simultaneously and, by duplexing (i.e., labeling two articles at a time), higher speeds are obtained than with the rotary type. Productive capacities of 120 per minute are obtainable.

Special units are built for a wide variety of requirements, such as labeling both ends of a spool of thread, applying labels to one or both ends of a cardboard shoe box or hosiery box, applying all-around labels to rectangular spice canisters, to mention a few.

The straight-line multiple type, as its name implies, labels a group of containers simultaneously. The production or capacity is determined by the size of the group of containers labeled simultaneously, multiplied by the machine speed in cycles per minute.

Available machines of the straight-line multiple type

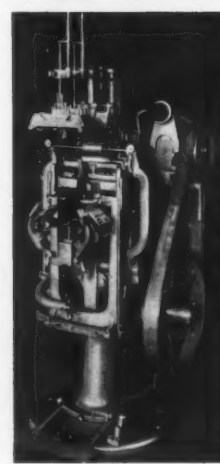
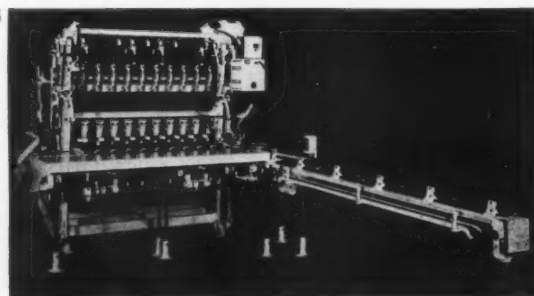
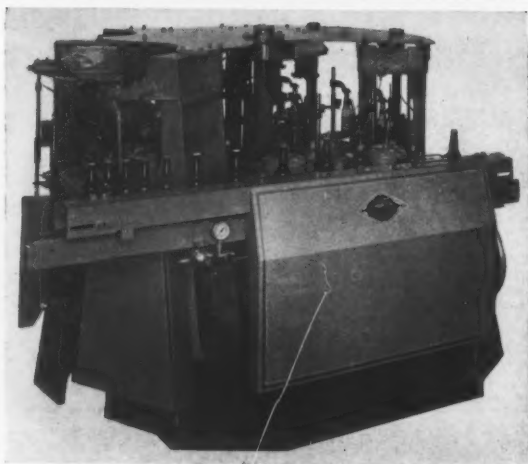
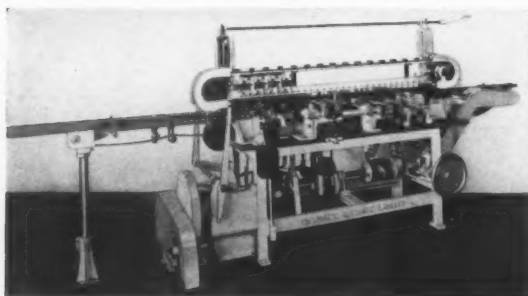
use the "picker" method for transferring and applying body, or body and neck labels to groups of 4, 6, 8 or 10 containers simultaneously for respective capacities of 80, 120, 160 or 200 per minute; or body and foil, or body and neck and foil to groups of 4, 6 or 8 containers simultaneously for capacities of 80, 120 or 160 per minute.

In choosing the type of labeler, certain essential points should be borne in mind:

1. The type of label material to be handled—whether plain paper, varnished or lacquered, or foil labels or metallic seals.
2. Whether the label is rectangular or odd shaped.
3. The type of bottle, jar or package to be labeled.
4. Range.
5. Ease of changing from one size to another.
6. Cost of change parts and their simplicity.
7. Control of the adhesive application.
8. The cleanliness of the labeling job.
9. The accuracy of the labeling job.
10. Accessibility of the machine in the plant.
11. Productive capacity that will be required.

Round can labelers

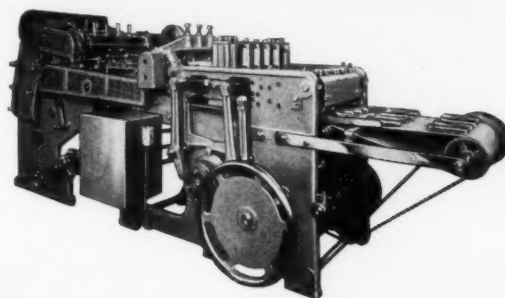
The labeling of round cans, such as are used by the food, paint, soap, lubricant and other industries, presents a problem which is different from the general labeling as described above. The label as used on this package is of the "wrap around" type, the extremities lapping over each other. Consequently, for this purpose, round can labelers have been designed, both of the semi- or hand-fed and fully automatic types.



4. Duplex front and back labeler for face cream jars. Photo Pneumatic Scale Corp., Ltd. 5. Straight-line multiple automatic labeler; labels ten bottles simultaneously. Photo Edward Ermold Co. 6. Automatic rotary labeler for soft drink or beer bottles. Photo Liquid Carbonic Corp. 7. Semi-automatic labeler adjustable for various shaped bottles and jars. Photo Economic Machinery Co.

"NOW...

MORE THAN EVER...



HIGH SPEED CANDY WRAPPING MACHINE

WE APPRECIATE HUDSON-SHARP QUALITY"

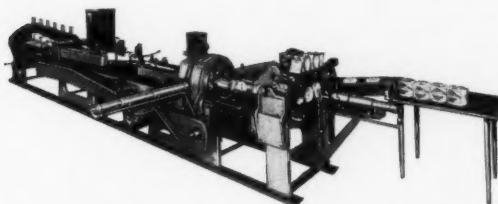


Our entire productive capacity is now devoted to products essential to winning the war. We will however, continue to furnish replacement parts for our equipment where priorities can be furnished which will meet with the approval of the war production board. If we can be of any assistance in your production problems, do not hesitate to call on us.

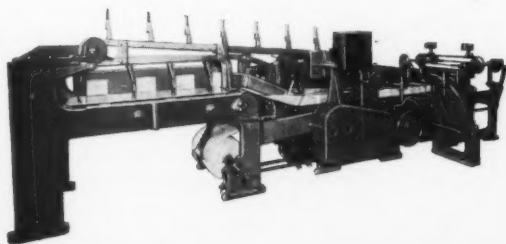
PACKAGING equipment takes a lot of punishment these days, and without question owners everywhere are prouder than ever of their foresight in choosing Hudson-Sharp machines to do the job.

Worked two to three times the peacetime average, the tendency toward breakdown and excessive wear is much greater—yet, these remarkable machines take it all in stride. Owners are proud of their reliable performance—efficiency—durability—and economy. They're proud too, that these machines step-up their entire wartime production schedules—with ease.

Today at Hudson-Sharp the war effort comes first, as it does with you—but when victory is won, we will again be ready to serve you with a newer, more complete line of packaging machinery.



HIGH SPEED MACHINE FOR IRREGULAR WRAPPING

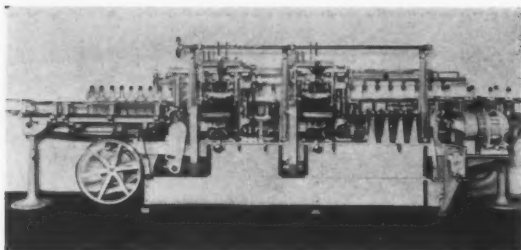


HIGH SPEED MACHINE FOR RECTANGULAR WRAPPING

HUDSON-SHARP

MACHINE CO • GREEN BAY • WIS

Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Crepers and Napkin, Toilet Tissue and Paper Towel Units.



8

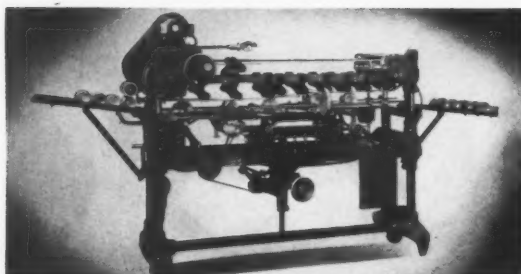
There is a distinct difference in these two types in that the former covers the label with adhesive over its entire surface, the latter applying adhesive partly to the can body and only to the glue lap of the label.

In the semi-automatic machine, the can as well as the label are introduced manually and the finished article ejected by hand as well. Production, as on all hand-fed machines, again depends on the operator, so that from 4000 to 6000 cans can be labeled per eight-hour day, the variance depending on the size of the package, the facility of bringing the work to, and taking the work away from, the machine and, as stated, the dexterity of the operator.

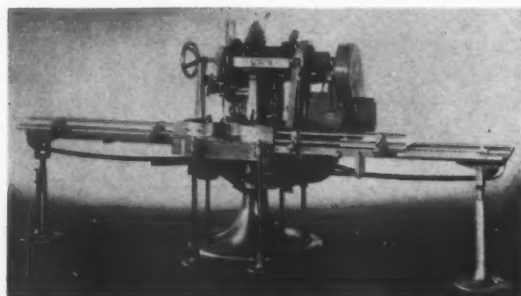
These machines have fairly large ranges and require no change parts, the range being self-contained. They are well adapted to small runs, frequent changes and for packages requiring the label to be adhered over the entire body surface.

In the fully automatic round can labelers, the cans roll down a track and have "spots" of adhesive applied. These "spots," when the can passes over the label hopper, pick up the label which is then wrapped around the can, the label having a glue strip applied to the lap. This glue strip forms the closing joint.

In preparing labels for these machines, to get the best results the grain of the paper should run parallel to the longest dimension.



9

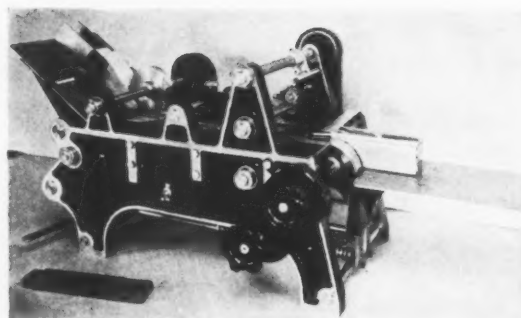


10

Label gummers

Label gummers are not truly labeling machines, for they are not used to actually apply the label to its point of final contact with the package. Their function is, rather, to apply a gummed coating to an uncoated label or to moisten a pre-gummed label and thus to facilitate hand application.

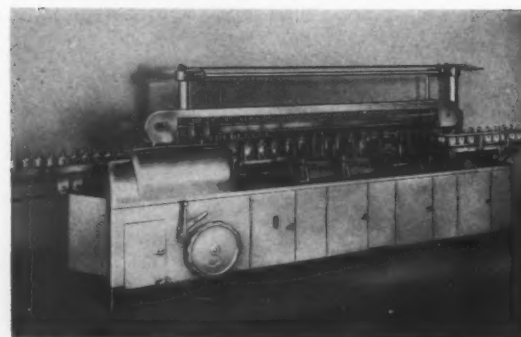
A number of types and variations are available, but all have the general characteristic of a motor drive rotating a cylinder partially immersed in, or in contact with, glue or gum or water.



11

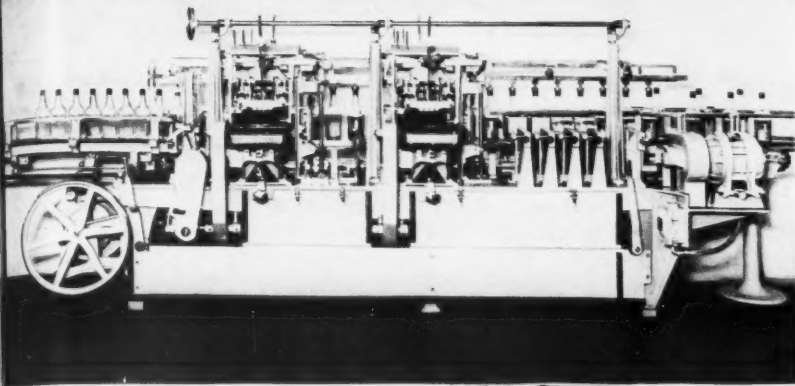
Coding devices

A number of devices have recently been developed for applying code numbers or other serial identifications to labels. These are usually punch-type machines designed for use near or adjacent to the labeler. They operate at speeds of as high as 250 labels per minute and are available in types that print or perforate. Change-over of code symbol is usually readily accomplished with but a short shut-down period.



12

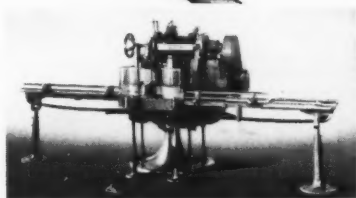
8. Automatic straight-line twin station labeler; applies front and back, body and neck labels to bottles. 9. Heavy duty round can labeling machine. 10. Automatic rotary labeler for applying front-back-and-body-neck labels. 11. Small machine for printing code numbers and symbols on labels. 12. Duplex labeler with full automatic spotting device. Can apply front label or front and back labels simultaneously. Spotter device automatically rotates bottles and applies labels in fixed location as related to molded design or raised letters. Photos 8, 10 and 12, Economic Machinery Co. 9, Standard-Knapp Corp. 11, The Lakso Co.



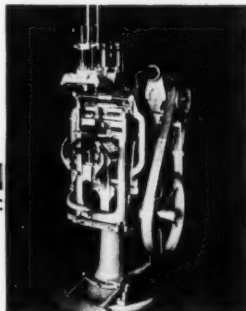
The **WORLD Automatic BEE-LINE Straightaway Labeler** is providing precise full automatic application of front or front and back body labels — and neck labels if desired — to round, square, flat, oval or panel bottles or flasks. It conducts each container gently, surely and steadily through the entire operation in a straight line without stops, detours or collisions — ideal for the modern, light weight glass. The **WORLD Model HG BEE-LINE** does an equally smooth high production job on gallon or half-gallon jugs or bottles.

The **WORLD BEE-LINE HI-Production Straightaway Labeler** (pictured) is equipped with twin labeling stations, labels two bottles simultaneously while operating at the most efficient one-at-a-time speed.

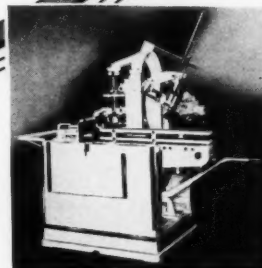
These **WORLD** Labelers
Are Proving to Hundreds of Producers
of Nationally Known Products That
"They Get The **BEST** Labeling In The **WORLD**"



The **WORLD Automatic ROTARY Labeler** has the labeling situation well in hand in many of the Country's best run, mass production bottle shops. This sturdy, dependable, full automatic labeler applies body labels or body and neck labels, independently or in one operation, to every kind and size of round bottles.



The **WORLD Model S Semi-Automatic Labeler**, World's most flexible labeler is proving its worth day in and day out wherever the labeling problem covers a wide variety of container sizes and shapes. It applies front and back labels; body, neck labels or labels that go all 'round the bottle, to any size and shape bottle from tiny samples to gallon jugs.



The **WORLD Automatic Uni-Turret Labeler** provides low cost, full automatic labeling of smooth, fluted or fancy containers. Its patented sliding picker motion permits gumming of the entire label surface or any part of it.



As long as the wartime emergency exists, **WORLD** Labeler headquarters offers its experience and service facilities for conserving and maintaining your existing labels. Whatever your labeling problem, we want to continue to render you the utmost assistance.

ECONOMIC MACHINERY COMPANY

Soldiers of World Automatic and Semi-Automatic Labelers for Every Purpose

Worldwide Headquarters

NEW YORK | PHILADELPHIA | PITTSBURGH | CHICAGO | SAN FRANCISCO | BOSTON | LOUISVILLE
ST. LOUIS | CINCINNATI | CLEVELAND | INDIANAPOLIS | KANSAS CITY | MEMPHIS
NASHVILLE | OMAHA | PORTLAND | RICHMOND | ST. PAUL | TAMPA

Wrapping Equipment

THE wrapping of packages can be divided into two broad groups: removable wrapping and tight or wet wrapping, so called because the inside surface of the wrapper is covered with glue. Wet wrapping has taken its place in the wrapping of cartoned goods, such as soap powder, salt, sugar, cereals and other food packages, because of its ability to prevent insect infestation and leakage. Nevertheless, because of its practicability and adaptability, removable wrapping has come into wide general use for many purposes in present-day packaging.

Prior to the restrictive orders, manufacturers were much inclined to increase their use of attractive overwraps of cellophane. They realized that the sales value of a package is considerably enhanced when it is so packed that it does not lose its attractiveness once the outer wrapper is removed. Particularly is this true in such things as confectionery, cosmetics and the like. Under normal production conditions, moistureproof cellulose would be used where a fairly airtight, moisture-proof package was required. Under wartime restrictions (L-20) however, such overwraps are forbidden. Glassine and waxed paper, not being—at least for the present—on the priorities list for such overwrapping, may be used. Crackers, tobacco, cigarettes, chewing gum, etc. are some examples of goods which might require such protection. In the case of cigarettes, the protection of cellophane wraps is possible when foil is not used under L-20.

When private brands for different customers are to be handled, plain cartons may be wrapped in printed ma-

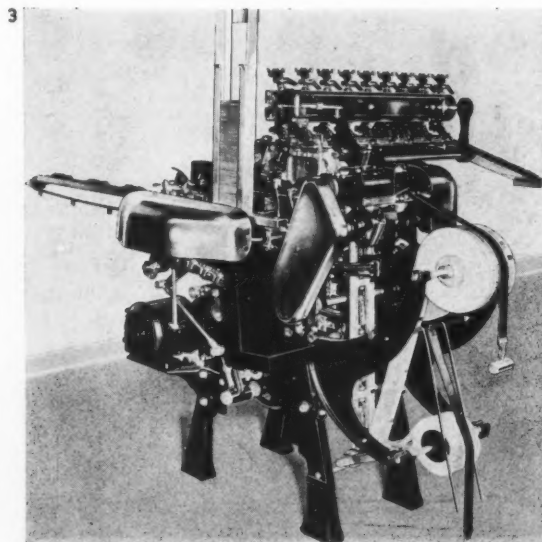
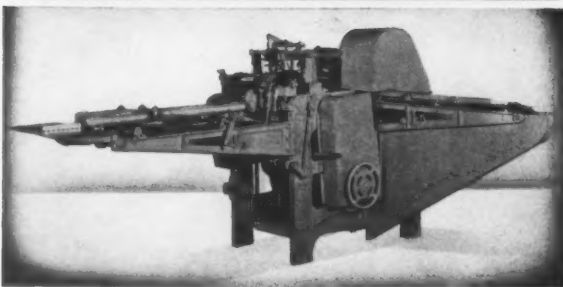
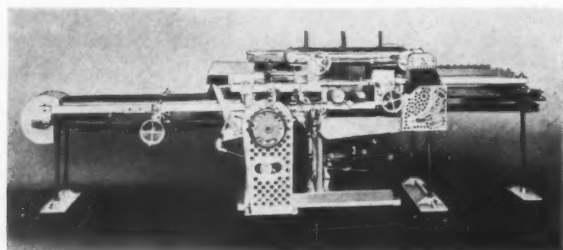
terials or in unprinted wrappers and labels, for identification and appearance. The loose wrappers can be held in place on the cartons by means of thin glue lines applied automatically, which will prevent the wrappers slipping from the cartons after they have been opened.

The loose wrap lends itself especially well to the placing of a circular or premium between the box or carton and the outer wrapper and where a revenue or tax stamp is necessary, as in the case of cigarettes. Provisions have been made on many automatic wrapping machines to make the feeding of the circular from a magazine a part of the wrapping operation.

A great advantage of the loose wrap is, of course, that it can come in contact with the article to be wrapped without the need of an inner protective covering. Individual pieces of candy are cut and sized on the same machine and then wrapped in transparent cellulose or waxed paper with the ends folded or twisted. Irregular pieces of chocolate candy are wrapped in foil. Many different sizes and shapes of candy bars are wrapped in cellulose, paper or waxed paper and the addition of the electric eye makes possible the use of printed wrappers in roll form. Various kinds of pops are now being wrapped in waxed paper or heat-sealing cellulose on automatic machines. Bread and cakes, too, lend themselves equally well to the loose overwrap, as do, also, cigars, yeast and countless other articles.

It is only recently that the use of automatic wrapping has been considered in the frozen foods industry and here the loose wrap is necessary. A wrapper which can be

1. Wrapping machine adjustable to various sized packages for boats, trays, extension edge boxes and cartons. Photo Package Machinery Co. 2. Machine for wrapping gauze bandages of various widths and different sized rolls. Photo Richard Machine Co. 3. Machine for wrapping candy bars or other irregular shaped and delicate products. Photo Modern Equipment Corp.



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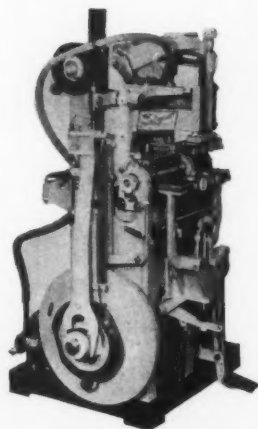
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heat-sealed will withstand the low temperature conditions necessary in packaging and preserving frozen foods and waxed paper or heat-sealing cellulose is used. Both of these materials are, of course, obtainable in printed roll form and the electric eye can be used to register the printed panels properly.

Other uses have also been found for carton and box wrapping machines. Automatic bundling of cartoned merchandise is a comparatively new development and is very popular with the manufacturer who is confronted with the problem of distributing his goods economically. The cost of paper wrappers is considerably less than that of pasteboard containers and the lower weight of paper as compared with the pasteboard will materially reduce shipping costs, especially where the shipping distance is fairly substantial and particularly when paper shortages may cause high prices of board.

The advancement of machine wrapping has also resulted in the development of many new machines of a highly specialized nature. Included in this group are machines for wrapping cakes of soap, bars and pieces of candy, cigars, packages of cigarettes, yeast cakes, fruit drops and mints and many similar articles and packages. All of the popular types of wrapping materials can be handled by these machines and, here again, electric-eye registration has been important. The wrapping operation on these machines has also been improved to decrease the amount of wrapping material needed. Especially is this true in the confectionery trade, in the wrapping of candy pops, where the use of a tight twist, heat-sealed, has decreased by about 20 per cent the amount of wrapping material needed.

While box or rectangular object wrapping is an important part of the wrapping machine art, it is only one part. For candy, machines are available to take the candy in plastic form, form it, cut it and wrap it, either with folds or with twisted ends and speeds can be attained up to 500 or 600 a minute. With twisted wrapping, the machine can be arranged so that the twisted

ears can be colored and colored inserts can be put inside the wrapper. Old standbys, such as kisses or caramels, can be dressed up now in a highly attractive and salable form and, as a result, the merchandising of candy is taking a new lease on life. Waxed paper wrapping of these products is still possible.

The wrapping of pound and sliced pound cake has become quite prevalent in the East and, as a new means of merchandising cake, it is becoming popular. To do this economically, the cake bakeries have had to set up their production for automatic wrapping as the cost of large batteries of girls for wrapping the cake by hand proved too expensive. An automatic machine which accomplishes this purpose is equipped with a band-labeling attachment and cardboard inserting mechanism.

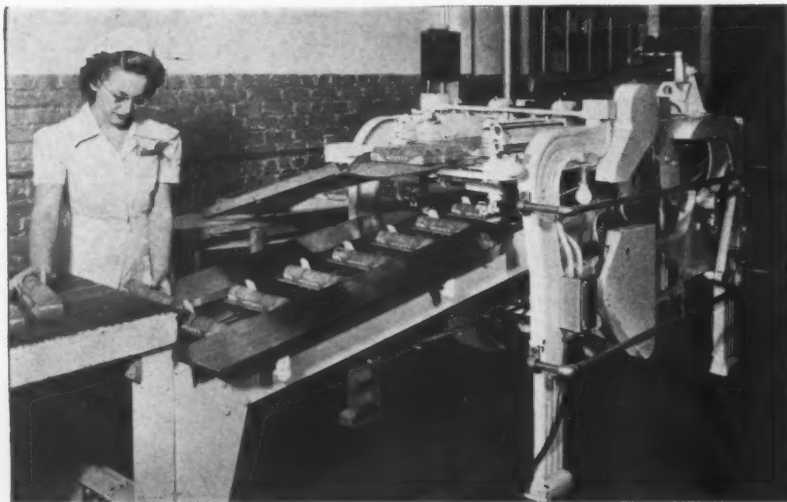
A newer development along the lines of registration is the use of a miniature printing press, using quick-drying aniline ink and geared to the paper feed of the machine. The press prints material as it is being fed from the roll into the machine. Registration is automatically taken care of, without the use of an electric eye.

The use of strong wrapping materials has resulted in the development of easy-opening devices such as tabs, tapes and machine-made nicks to facilitate the opening of

4



5



4. Semi-automatic machine for cellophane wrapping of flat packages in crimped style. Photo Miller Wrapping and Sealing Machine Co. 5. Wrapping machine with conveyor; wraps cookies in boats and automatically heat-seals label on each package. Photo Oliver Machinery Co.

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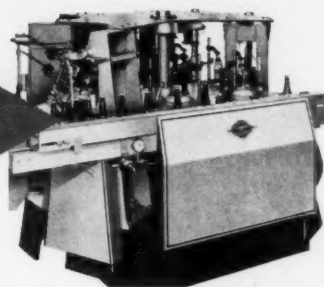
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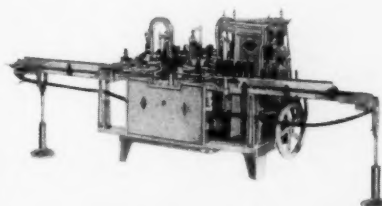
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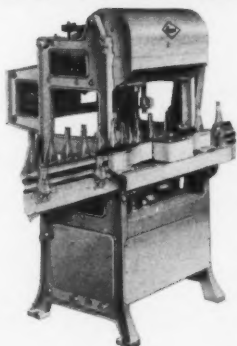


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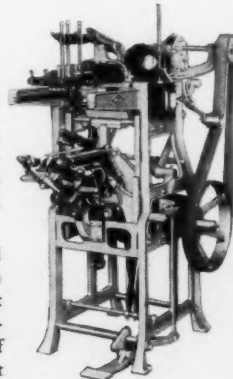
RED DIAMOND LABELER

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6. Gum wrapping machine; wraps each individual stick, bands five with printed wrap and applies outer cellophane wrap with "zipper" tape; speed 600 sticks per minute. Photo Package Machinery Co. 7. Cellophane wrapper equipped with mechanism for applying tear strip. Photo F. B. Redington Co.

the packages. Such devices are now being used extensively on such small, packaged goods as cigarettes, fruit drops and chewing gum.

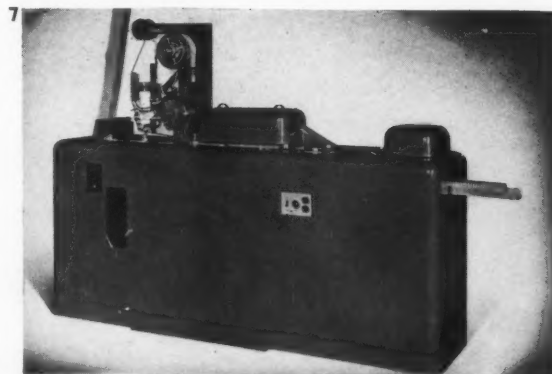
The wrapping of chewing gum is receiving a great deal of attention at present because of the development of high-speed automatic wrapping machines. A machine is now available to wrap small individual sticks of gum at a speed in excess of 600 a minute. The machine will apply an inner wrapper fed from a roll and a printed band fed in sheet form. A thin strip of adhesive will glue the outer wrapper to the inner and prevent its slipping off the end of the stick. Regular sizes of individual sticks are being wrapped with an inner roll fed wrapper and an outer printed label, at speeds up to 400 a minute.

If the individual stick wrapper and a package assembler and wrapper are used together, the complete wrapping job will be a continuous and automatic one.

In considering machine wrapping, three elements always enter the picture—speed, adjustability and price—and the three have an intimate relation to one another. The more specialized the machine, the higher is possible production, and the more difficult it is to change the size. At one extreme are the high-speed chewing gum machines just mentioned; at the other extreme are the carton wrapping machines, based on the principle of bread wrappers, where a size change can be made in less than five minutes over a wide range, but whose speed is limited to slower operations.

Semi-automatic machines

Semi-automatic wrapping machines require a smaller investment and permit extreme flexibility with regard to size and nature of packages. This makes them valuable to both the small and large scale manufacturer. It gives the former all the wrapping equipment he needs and allows the latter an economical means of wrapping his smaller runs, producing novel packages or testing new packages on the market at little expense.



Versatility of the semi-automatic wrapping machine extends beyond mere "adjustment range." It permits the wrapping of irregular, loose or stacked items or packages, because of close contact of the operator with the folding operation. The odd package can be guided, by hand, just enough to make allowance for its peculiarities. A few examples in this category are packages composed of several loose pieces, such as four bars of soap and a wash cloth.

The semi-automatic machine will wrap with a variety of materials, either heat- or glue-sealed, including heat-sealing cellophane, waxed papers, waxed foil and the non-heat-sealing materials, such as plain transparent sheets, kraft and other ungummed or unwaxed papers. If a manufacturer of pharmaceuticals should desire to wrap his packages first individually in heat- or glue-sealing cellophane, then bundle them by dozens in kraft paper, the semi-automatic would perform both jobs, laying glue on the kraft paper to seal it.

Instant adjustability makes the semi-automatic wrapping machine suitable for very short runs. On a moment's notice, it can be changed over from the smallest to the largest package within its range. Adjustments

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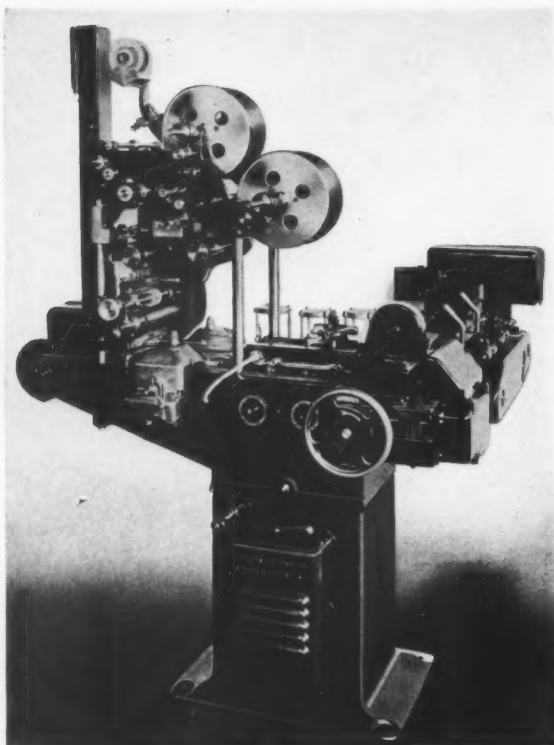
cator travel provides close accuracy in trimming filled packages. Available in either portable floor or bench style scale.

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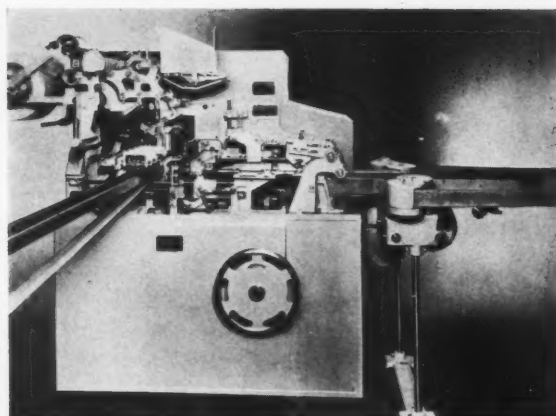


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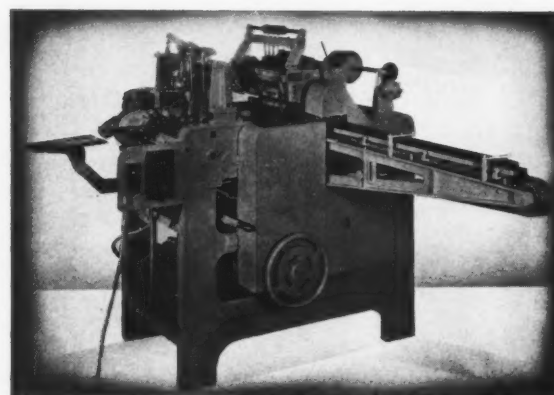
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8. Machine for high speed application of outer wrap and "zipper" tape to cigarette packages. Photo Package Machinery Co. 9. Machine for wrapping irregular shaped articles in special sheeting material. Fed from roll, heated under electric plates. Seal is formed by twisting the finished package. Photo Stokes & Smith Co. 10. Soap wrapping machine adjustable for various materials and sizes. Photo Package Machinery Co. 11. Machine for wrapping five bouillon cubes in packet. Speed sixty packets per minute. Photo Richard Machine Co.

have been so simplified that a girl operator, unassisted, can make a complete size change without tools.

Speed of semi-automatic machines, while naturally less than those of the full automatic, is adequately high to exceed, by many times, that of hand wrapping and wrapping by means of simple fixtures and jigs. In some cases, particularly where frequent adjustment is required, or where great economies in wrapping materials are possible, the semi-automatic shows even greater savings than the automatic. Each machine has its place and they seldom overlap, so determination of the equipment indicated for any particular job is not difficult.

Packages produced on semi-automatic machines are uniformly neat and well sealed, whether with heat or glue. When heat-sealed, the hot plates are kept under thermostatic control, so that there is no injury to either the wrapper or packages. Packages containing heat-perishable goods, such as chocolate, butter, icings, frozen foods and the like, can, if necessary, be passed quickly through the heat-seal region, so that a seal takes place, but the heat cannot penetrate far enough to be injurious. When glue is used for sealing purposes, the amount of flow and area of application can also be positively controlled, so that results are unerringly the same and the machine user can have confidence in the



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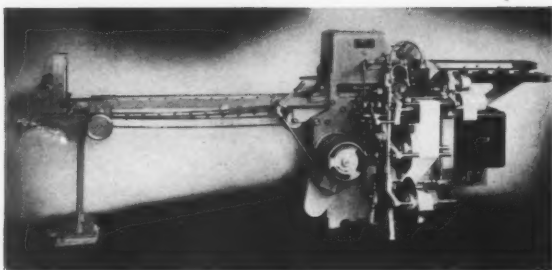
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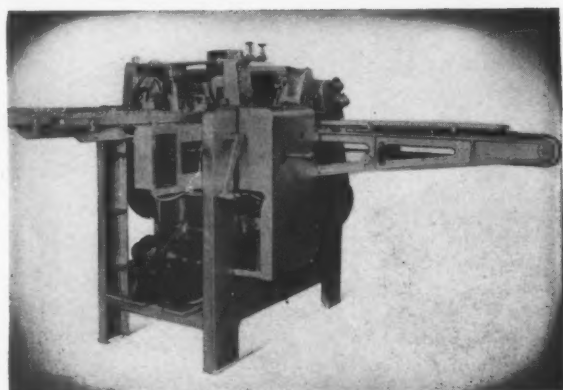
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PACKAGING CATALOG

425



12



13

12. Automatic machine for wrapping irregular shaped confectionery bars. Photo Package Machinery Co. 13. Heat-sealing wrapper for cartons, boats and irregular objects. Photo Richard Machine Co.

uniformity of his product, both in appearance and protection afforded by the wrapper when applied by this efficient method.

Bottle wrapping is another achievement of the semi-automatic wrapping machine. Using many of the principles of the package wrapping machine to retain the valuable feature of adjustment for many sizes, this equipment also provides a clever means of neatly tapering the cellulose wrap from the shoulder to the cap of the bottles.

Ordinarily, the semi-automatic machine folds and seals the wrapper over the bottom and two ends of the package in the manner that an ordinary biscuit carton is usually wrapped. However, where a very shallow package is to be wrapped, where the ends do not offer sufficient depth for a satisfactory end seal, the end folds can be tucked under the ends of the package or "underlapped." This feature is useful on flat packages, such as cake slices, sheets of writing paper and even extension edge candy boxes, which are recessed at the sides and ends so that a conventional seal is impractical.

The semi-automatic wrapping machine can also be furnished with a number of money-saving attachments, such as a coding device for perforating letters or numbers in the wrapper, or a banding attachment for attaching printed bands to the wrapper.

Hand wrapping fixtures

A number of simple and inexpensive tools have been developed, in recent years, to aid hand operators in wrapping heat-sealing materials. These include hot plates of various types upon which a package may be placed momentarily to achieve a seal. Where line seals or spot seals are desired, special heating irons, equipped with thermostatic controls and similar in appearance to soldering irons, are sometimes utilized.

Tight Wrapping Equipment

TIGHT-WRAPPED packages are standard with many manufacturers and packers of food and grocery products. First adopted a number of years ago by some of the cereal manufacturers, where its greatest advantage was in keeping the weevil from getting into the contents, the tight-wrapped package has been adopted for use with many other products, such as flour, soap powders, salt, coffee, cereals, etc.

With the tight-wrapped package, the plain unprinted cartons are filled and sealed in the regular way. There are a number of different makes of semi-automatic and full automatic carton filling and sealing machines on the market. After the carton is filled and sealed, it is fed into the tight-wrapping machine which automatically feeds the paper label as the carton enters the wrapping machine, glues the label all over on the blank side with a thin coating of adhesive and wraps it tightly

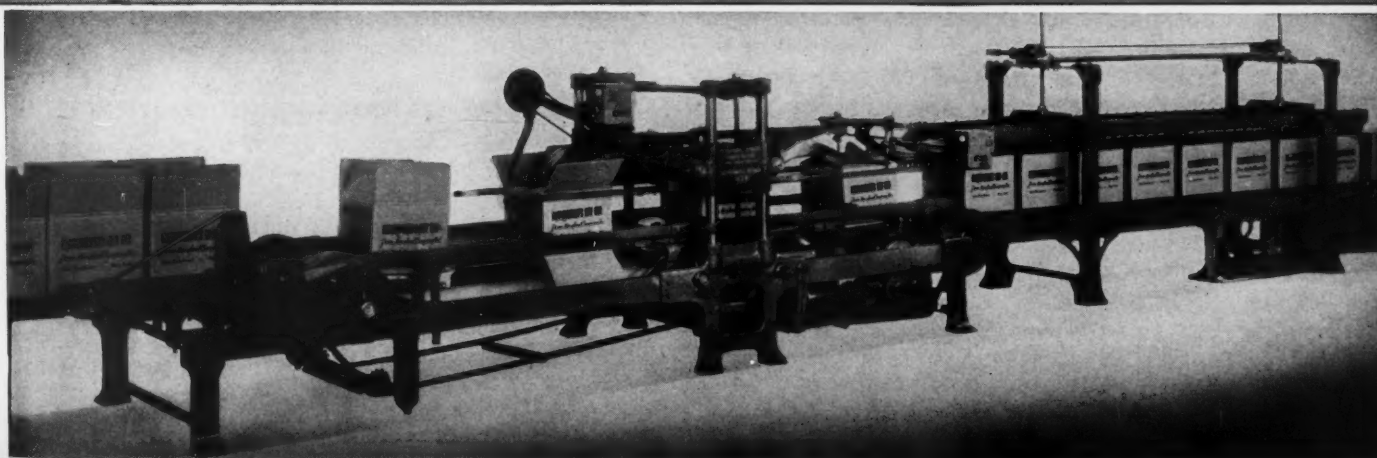
around the filled carton, making a perfectly tight-sealed, non-sifting, weevil-proof and attractive package.

Various types of cartons with inside bags or liners can be used with the tight-wrapped package, as well as different types of opening devices. In the salt industry, the tight-wrapped package is now being used by many of the leaders and one of the most satisfactory salt packages is a carton made of asphalt-lined board which is tight-wrapped on the outside. For coffee, wax or parchment paper liners are generally used on the inside of the carton and the cartons are tight-wrapped on the outside. For flour, the regular chipboard carton is used and some of the packers have these made with a blue lining on the inside which gives a whiter appearance to the flour. Various combinations of cartons, liners and labels can be used to insure the product getting to the consumer in the best possible condition of presentation.

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The famous Standard-Knapp case-packers and case-sealers, which ran so long and with so little upkeep in the plants of the largest factors in the beer, canned meat, cigarette, kitchen cleanser and dozens of other industries, are still doing their jobs. In many cases, they have been converted to handle the new products of their owners. In other cases, we have supplied similar equipment to new industries of war. We have also developed some new machinery to meet further war needs.

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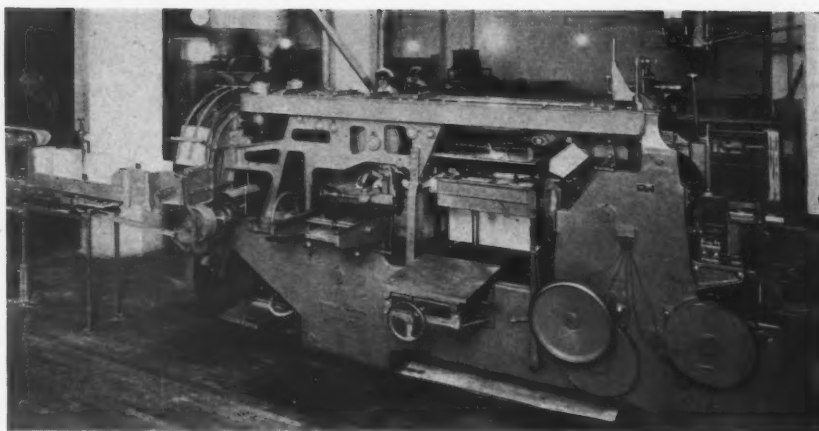
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1. Tight-wrapping installation at the plant of a Western milling company. Photo Stokes & Smith Co.

Another advantage of the tight-wrapped package is for the packer or manufacturer who packs private label brands for different customers. If he uses the tight-wrapped package, he can use the same carton and merely have different labels for the different brands. This means a saving as it is not necessary to carry a number of different printed cartons on hand. With the tight-wrapped package, various types of labels giving different styles of end folds can be used to suit the conditions. Some labels are die-cut so that each end flap of the label is glued down separately. Others are rectangular, making a gusset fold on the end.

Varnished tight wraps

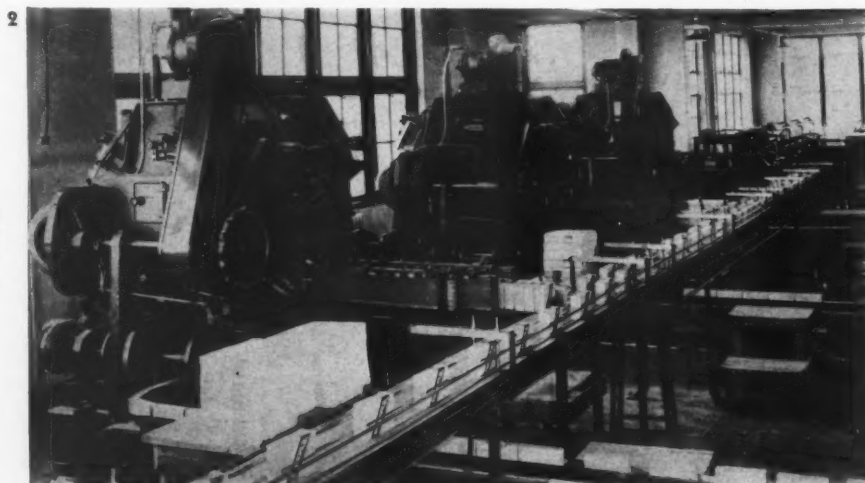
Recently the varnished label has been adopted by a number of packers and manufacturers using the tight-wrapped package and the package tight-wrapped with the varnished label makes an ideal container for many food and grocery products. The varnished surface makes the package attractive; the colors show up to advantage and the varnished surface will not accumulate dirt or dust as quickly. Also, the package is more moisture proof since the varnish gives an extra coating on the outside. Another variation of the tight-wrapped package is the one

wrapped with a metal foil wrap. In this case, the labels are made of metal foil laminated to paper so that the outside of the label is the printed metal foil and the inside is paper which can be glued uniformly to the carton.

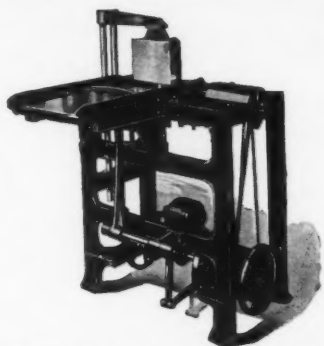
Another recent development combines the advantages of tight-wrapping and wax-wrapping at considerably lower cost. This is accomplished by printing and waxing only one side of the sheet of paper and gluing the underside to all four sides and top and bottom of the plain carton. This development has been made possible through the perfection of electric-eye methods of registration which permit roll-feeding of the printed and waxed stock. Roll-feed and electric-eye registration can also be applied to regular unwaxed tight wrappers and this is an advantage because roll-printing is less expensive than printing in sheets.

Adhesives

Various kinds of adhesives can be used to suit the requirements. For the ordinary paper tight-wrapped packages, a cold vegetable dextrine adhesive soluble in water is used. For varnished and foil wraps, there are several kinds of moisture proof adhesives and also latex substitute adhesives on the market.



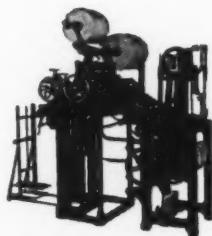
2. Battery of tight-wrapping machines delivering wrapped cartons to collecting conveyor. Photo Pneumatic Scale Corp.



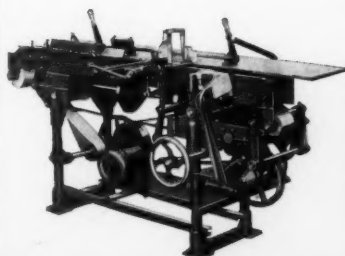
This PETERS JUNIOR CARTON FORMING AND LINING MACHINE sets up 35-40 cartons per minute, requiring no operator. Can be made adjustable to handle several carton sizes.



This PETERS JUNIOR CARTON FOLDING AND CLOSING MACHINE automatically closes 35-40 cartons per minute, requiring no operator. Can be made adjustable to handle several carton sizes.



This PETERS SENIOR CARTON FORMING AND LINING MACHINE equipped with AUTOMATIC CARTON AND LINER FEEDING DEVICE sets up 55-60 cartons per minute. Built for one size carton only.



This PETERS SENIOR CARTON FOLDING AND CLOSING MACHINE automatically closes 55-60 cartons per minute, requiring no operator. Built for one size carton only.

Here are the Machines

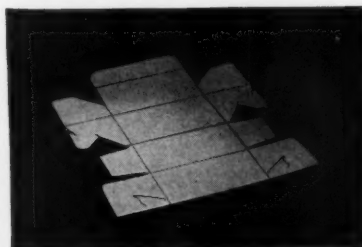
FOR PACKAGING CRACKERS,
SHORTENING, LARD, BISCUITS,
AND OTHER PRODUCTS FOR
THE *Armed Forces*

Speed is of paramount importance now and so are these machines in your plant. To the many companies who have this equipment, we urgently request that you keep them in first class operating condition. Carefully inspect them periodically and see that they are kept clean and well oiled. Order repair parts whenever you find it desirable to do so.

Companies who have requirements for new machines and can furnish an A-9 or higher priority rating, will find it to their advantage to place their order as soon as possible. Deliveries are not as fast as formerly and to prevent undue delay in your plant in starting into production, we suggest you act immediately.

Send us a sample of each size carton you desire to handle and we will be pleased to recommend and quote you on equipment to meet your specific requirements.

Your inquiry will have prompt attention.



Type of die cut cartons handled on machines.

PETERS MACHINERY CO.

4700 Ravenswood Avenue, Chicago, Illinois

Carton Loading and Closing Equipment

CARTONING machinery, as referred to in this article, includes machines, which, in general, feed a collapsed carton from a magazine, expand it, insert a solid item or a number of solid items into the carton and then close the carton. Among the items normally packaged on cartoning machines are tubes of tooth paste, shaving cream, etc.—bottles, jars, razor blades, candy coated gum, rubber jar rings, bouillon cubes and many other miscellaneous items including printed matter. Generally speaking, the type of cartoning machine under discussion is rarely or never used in connection with dry, free-flowing items such as coffee, cereals, etc., which need to be weighed before they are inserted into cartons. For this type of equipment see "Weighing and Filling Dry Products."

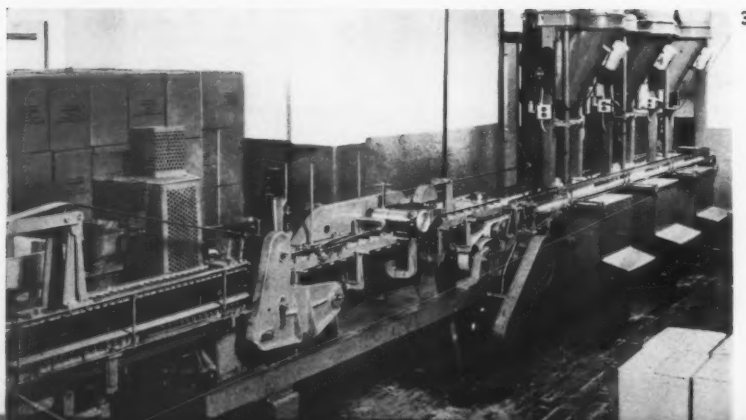
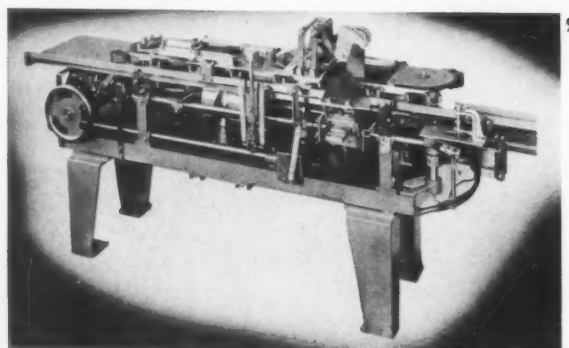
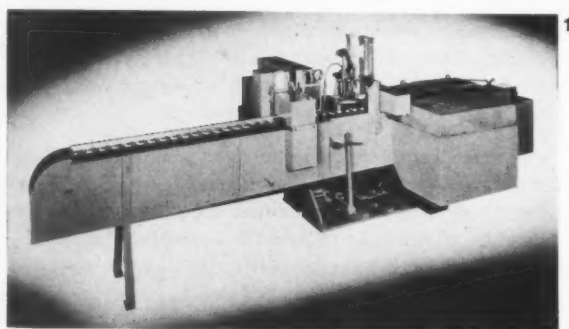
Whether or not a prospective purchaser of cartoning

machines or a producer of cartoned products is warranted in planning for the use of cartoning machinery depends upon a number of factors. First, of course, there is the matter of the number of packages he is required to produce daily or weekly. Secondly, there is the nature of his package. Some cartoned products can be packaged quite economically by hand. Others, because of their more involved nature, are prohibitively expensive to produce by hand. The best procedure involves the submission of packages to carton machinery suppliers who can, after a study of all the factors involved, recommend either an existing machine in their lines or advise concerning the modification of one of these machines.

In general, there are two types of cartons that are handled by automatic cartoning machinery. Most commonly used is the tucked carton equipped with top and bottom flaps which are tucked into position by the fingers of the cartoning machine. The other type is what is known as the glue end carton. This is used in cases where tamper-proof seal is desired or where the weight of the product would open the bottom tucks of the tucked type. In some instances, cartons are used with a combination of glued flaps at the bottom and tucks at the top. A third type is the die-cut but unglued carton which is set up and closed automatically. This type is used for packaging crackers, lard, shortening.

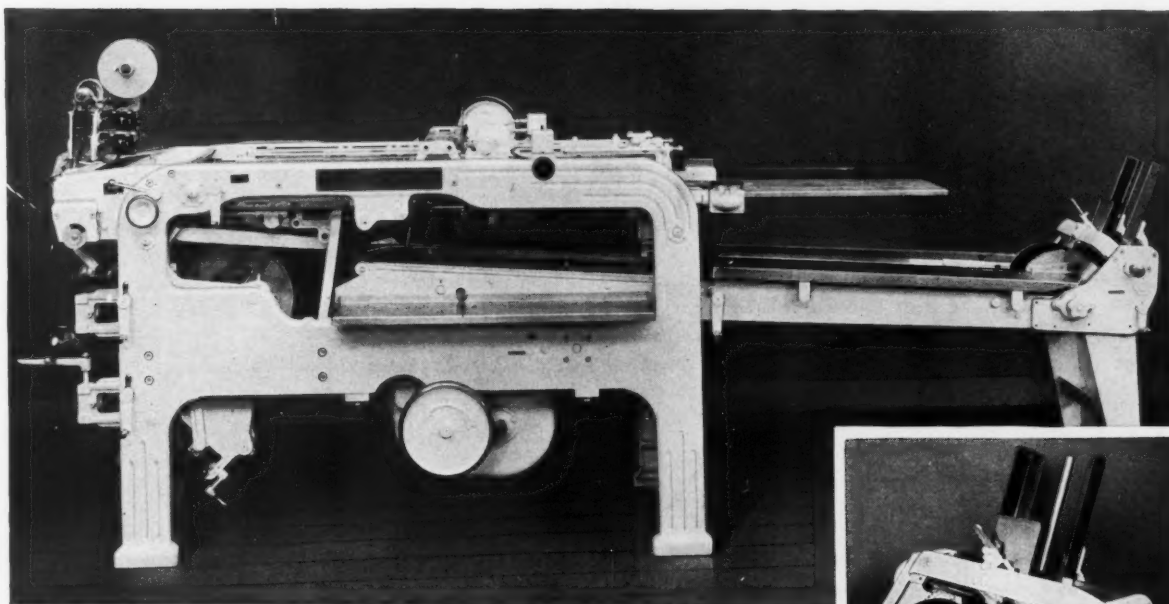
The variety of cartoned products is tremendously broad. Packages of razor blades stand, perhaps, at the end of the size scale. From this point, they range upwards to the large cartons used for macaroni or for cleansing tissues.

The efficient speeds at which cartoning machines now operate depend to a great extent on the nature of the product to be handled and the size of the package. Several well-known five-cent packages of candy coated chewing gum, containing twelve tablets, are automatically produced on machines that operate at speeds of 100 to 160 packages per minute. Safety razor blades are automatically counted out and cartoned at speeds as high as 240 packages per minute. Bars of soap and similar products are automatically cartoned at speeds of 150 or sometimes more per minute.

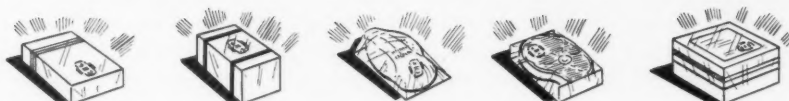


1. Automatic, high-speed, continuous-loading cartoning machine with mechanism for folding and including circular in carton. Has automatic feed cut-off. Photo F. B. Redington Co. 2. Automatic carton folding and closing machine. Photo Peters Machinery Co. 3. Automatic carton feeding and sealing machine coupled with three filling machines for packaging powdered eggs. Photo Stokes & Smith Co.

What is your toughest wrapping problem?



See what this new "Oliver" can do for you



Handles small cartons . . . large cartons . . . irregular shapes . . . open-top boxes

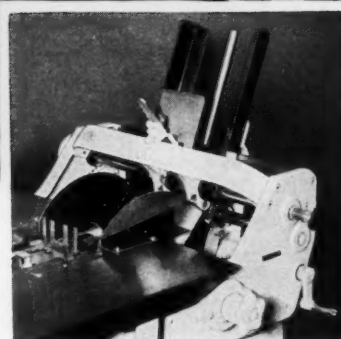
Does that tough wrapping job involve the overwrapping of a small or large carton? An irregularly shaped article requiring a cardboard support or tray? Or does it call for an attractive low-cost label? Maybe short volume items vex you. This full-automatic "Oliver" Wrapper is the solution to all these problems. It neatly wraps rectangular or odd-shaped articles with glassine, waxed, Cellophane or other heat-sealing wrappers.

Besides the features described at right, there are

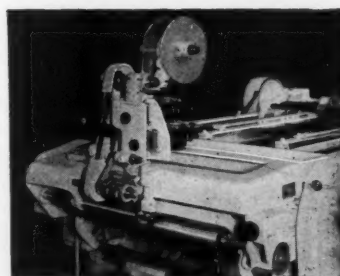
many other worthwhile advantages. It is easily and quickly set up and adjusted. Straight-line operation calls for only one operator—usually a girl. Wrapper tension is instantly adjustable to the nature of the contents. Thermostatic sealing effects an extra strong, air-tight seal (preventing dehydration).

Plus features include high grade grease-sealed ball bearings and precision construction . . . insuring years of quiet, dependable service.

Wraps up to 45 items a minute.



★ Automatic Cardboard Folder and Feeder—just what you need for articles requiring cardboard supports or trays. It automatically folds scored cardboards and feeds them (or flat cardboards) in front of each flight bar of the package conveyor. Soon pays for itself.



★ Automatic Roll Type Labeler heat-seals attractive die-cut labels in almost any position on the package. Uses rolls of labels—very economical and convenient. If desired the labels can be automatically coded as they are applied.



Write for Complete Information

OLIVER MACHINERY COMPANY
GRAND RAPIDS MICHIGAN



saves Time . . . saves Labor . . . saves Materials

PACKAGING CATALOG 431

Collapsible Tube Filling

THE selection of tube filling equipment depends on three important factors: first, the consistency of the material; second, the range of tube sizes; third, daily production.

Liquids and semi-liquids that are self-leveling and will flow by gravity are the least difficult to handle as the material will run into the tube from the top, will fill uniformly and will be free of air bubbles. Furthermore, the material can be easily fed to the hopper of the machine and will flow down through the hopper, by gravity, into the filling mechanism. Tooth pastes, shaving creams and similar materials that will not flow by gravity must be filled by placing the filling nozzle down into the bottom of the tube and filling from the bottom up to prevent air pockets. In most cases, the filling pump will pull the material down into the hopper, but if the material is "short" and breaks apart, an impeller type agitator must be used to force it down through the hopper. Creams, ointments and similar pastes that will not flow by gravity can sometimes be made to flow by warming them. The machine, in this case, is equipped with a jacketed hopper and an agitator to keep the material at a uniform temperature and it is also equipped with heated filling parts. Before adopting this method, it is important to determine whether the material shrinks on cooling, as any shrinkage will draw the walls of the tube in and give it an empty appearance.

The majority of the machines on the market will handle tubes up to $1\frac{1}{2}$ in. in diameter by 6 in. long and many of them will handle tubes up to $1\frac{1}{2}$ in. in di-

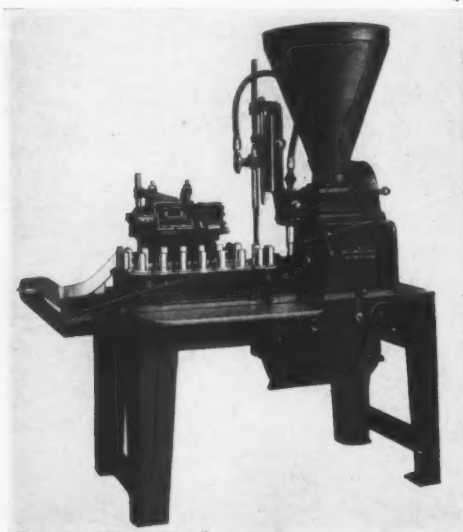
ameter by 7 in. long. Hand-operated equipment will handle somewhat larger tubes, but the semi-automatic and automatic machines must be modified to handle tubes over 7 in. in length.

The production requirements will, of course, determine whether hand-operated, semi-automatic or full automatic machines should be used. All three types are available and range in capacity from 100 or less tubes per hour up to 7000 an hour.

Machine types

A complete outfit for filling, closing and clipping collapsible tubes may be purchased for as little as \$275 and will put up from 10 to 20 tubes per minute, using three operators. Two types of hand-operated filling machines are available, one for liquids and semi-liquids and the other for pastes. Both are easily adjustable and both fill the tubes as accurately and as cleanly as do power-driven, automatic equipment. The filled tubes are then transferred to a small, hand-operated folding machine which applies a double fold or which can be furnished to apply the quadruple fold. A third operator indents the folds such as on clipless closures, or clamps on a clip, by means of a foot-operated press. Certain models can be equipped with electrically heated jaws for applying the hermetic seal described below.

A production of about 30 filled and sealed tubes per minute can be had by using a general purpose filling machine and then transferring the tubes to a second machine which folds the ends and seals them. Two operators are



1. Automatic machine for tooth pastes, shaving creams, ointments, etc. Fills, closes and crimps automatically. Photo Arthur Colton Co. 2. Machine for handling liquids, ointments or pastes at a rate of 25 tubes per minute. One operator is required. Photo F. J. Stokes Machine Co.

Redington Packaging Machines

have a 46-year record of packaging jobs well done for practically every type of product

CARTONING MACHINES

● Consult Redington for automatic cartoning of practically any solid item. Machines are available for inserting bottles, jars, collapsible tubes, razor blades, candy coated gum, oleomargarine, macaroni, soap and almost any other solid item or container in glued-end or tuck-end cartons. Redington Cartoning Machines can be equipped with circular mechanism for automatically handling printed advertising matter—means for code stamping carton—means for printing on cartons—mechanism for other features such as placing a corrugated protector around bottles.

WRAPPING and CELLOPHANE WRAPPING

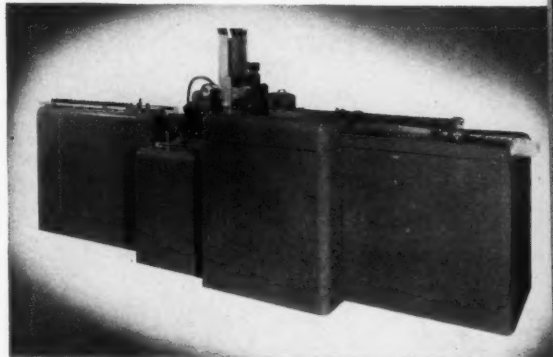
● Consult Redington for high speed wrapping machines for handling products in Cellophane, Sylphrap, wax or glassine paper and other wrapping materials. Redington Wrapping Machines can be equipped with mechanism for applying "Easy Opening Tape"—with photoelectric cell mechanism for controlling cut-off of printed design—with special mechanism for handling government stamps for tobacco packages, and with many other special mechanisms.

Combination CARTONING and WRAPPING

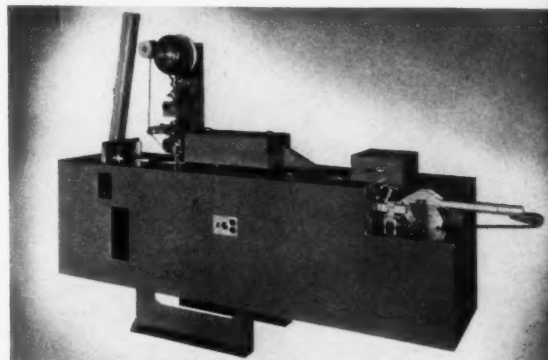
● Consult Redington for machines for such items as the Schick Injector package, candy coated gum and other packages where it is advisable to carton and wrap on the same machine. Photoelectric cell mechanism for registering printed wrapping material, and easy opening tape mechanism are available.

SPECIAL PACKAGING

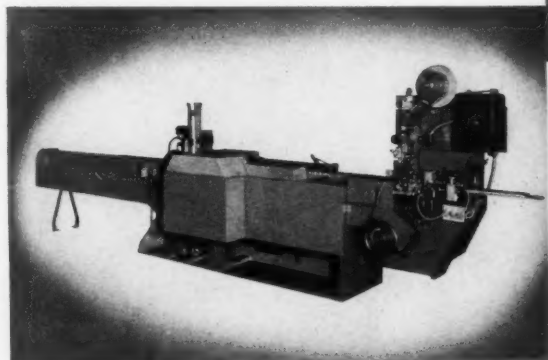
● Consult Redington for packaging machines that defy classification... the unique wrap of Listerine, the double wrap for Crystal White Soap, the interlocking wrap for tins of Underwood's Deviled Ham, the Phillips Milk of Magnesia package, Bayer's tins of Aspirin, Life Savers, professional and sample envelopes for Bayer's Aspirin and Grove's Laxative Bromo Quinine.



Type 23 Continuous Loading Cartoning Machine for handling Fitch's Ideal Hair Tonic. Same type machine built for items shown at the left, as well as for many other products.



Type 96 high speed Cellophane Wrapping Machine with means for applying Easy Opening Tape. Machine shown was built for wrapping cigarette packages. Available for high speed wrapping of similar items.



Type 23 Continuous Loading Cartoning Machine combined with Cellophane Wrapping attachment. This combination unit not only inserts article into carton but also wraps closed carton in Cellophane.



F. B. REDINGTON CO. (Established in 1897) 108 So. Sangamon St., CHICAGO, ILL.

needed. In the case of liquids, it is possible to put a filling attachment directly on to the folding and sealing machine, in which case one operator can fill, fold and seal up to 30 tubes per minute. These machines can be equipped with variable speed drive, so that the speed of the machine can be adjusted for individual jobs.

For the manufacturer who has a varied line of products, a completely automatic tube filling, closing and sealing machine is available which will handle up to 50 tubes per minute with one operator. This machine will handle both pastes and liquids, since the tubes are raised up over the filling nozzle and are filled from the bottom up. The machine can be set to make a plain double fold, a quadruple clipless fold or the hermetic seal. The operator simply places the tubes into the tube cup and registers them so that the trade mark or printed matter on the tube will be in proper relation to the fold. Ejection is automatic on to a conveyor.

A full automatic machine is available with four filling heads capable of filling up to 120 tubes per minute. This machine automatically removes the tubes from the shipping cartons, registers the printed matter by means of a photo-electric cell and fills, closes and discharges.

The simplest type of closure is a plain double fold. This is neat and attractive in appearance and is sufficiently strong for materials, such as rubber cement and glues, that automatically harden and prevent further seepage in the event they leak through the fold. It is also satisfactory for thin pastes and similar materials that are easily extruded and do not strain the fold when

forced out of the top of the tube. This double fold can be strengthened considerably by indenting the metal.

Clipless closures

The so-called clipless closure consists of a quadruple fold, reinforced by corrugations. The ten layers of metal that result are as strong as a clip and considerably more resistant to seepage and leaks.

When the tube is folded, the walls come together and give the tube a wedge-like appearance. The volume of the tube is reduced considerably and the material is forced up toward the fold. For this reason, tubes must not be filled more than about $\frac{3}{4}$ or $\frac{7}{8}$ full.

The ordinary double and even quadruple fold is reasonably tight, but many materials quickly seep through and either corrode the tube or give it a very unattractive appearance. Many methods have been devised to seal the tube absolutely tight, with varying degrees of success. One method is the hermetically cemented closure. The tubes are coated, on the end where the fold is made by the tube manufacturer, with a special transparent cement. The tubes are filled and folded in the usual manner on regular equipment, but the crimping jaws are electrically heated and when the fold is corrugated by them, the heat fuses the cement and produces a tight seal.

Another tube sealing method, available on a patented machine of one manufacturer, uses a welding process to seal the tube walls together. This, it is claimed, permits a saving of up to three-quarters of an inch of material on each tube.



3

3. Collapsible tube filling, folding and crimping machine. Photo, Arenco Machine Co., Inc. 4. High-speed filler designed to fold the tube and, after filling, apply a welded seal. Photo, The Karl Kiefer Machine Co.



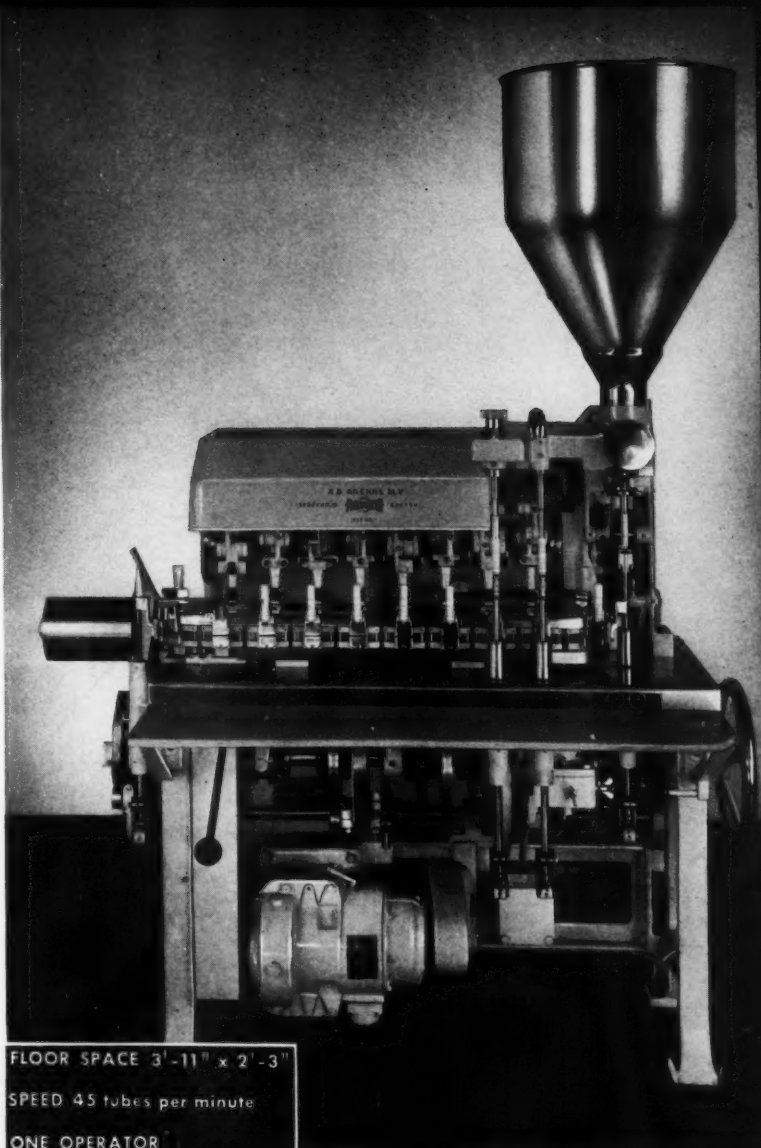
4

THE ARENCO TUBE FILLER

Fills, closes and seals collapsible tubes . . . interchangeable to handle pastes, creams, lotions and liquids . . .

FEATURES . . .

- Automatic cap tightening.
- Automatic tube cleaning before filling.
- Positively correct quantity in each tube.
- Clean filling—no spattering of inside closure wall—no material trapped in folds.
- No tube, no fill—no material delivered from filling nozzle if tube is missing.
- Ample passage for material—no valves or long tube connections. No squeezing to change consistency or viscosity of material.
- Quick cleaning when changing from one material to another.
- Quick changing from one tube size to another.
- All parts of machine easily accessible for control, lubrication, and cleaning.



FLOOR SPACE 3'-11" x 2'-3"

SPEED 45 tubes per minute

ONE OPERATOR

TYPES OF ARENCO CLOSURES



1



2



3



4

• This machine was designed in close cooperation with the pharmaceutical and cosmetic industries; all drawbacks on older type machines have been specially studied and eliminated. Stainless steel or other non-corrosive metals are used in all parts contacting the material.

• This machine won a Major Award in the 11th All-America Packaging competition in 1941. Again Arenco design and workmanship have produced an outstanding machine, crowning more than sixty years of automatic machine building.



ARENCO TUBE FILLING
MACHINES are now used to
pack pastes, salves, and
ointments for the armed
forces of the United Nations.

THE ARENCO MACHINE COMPANY
INCORPORATED

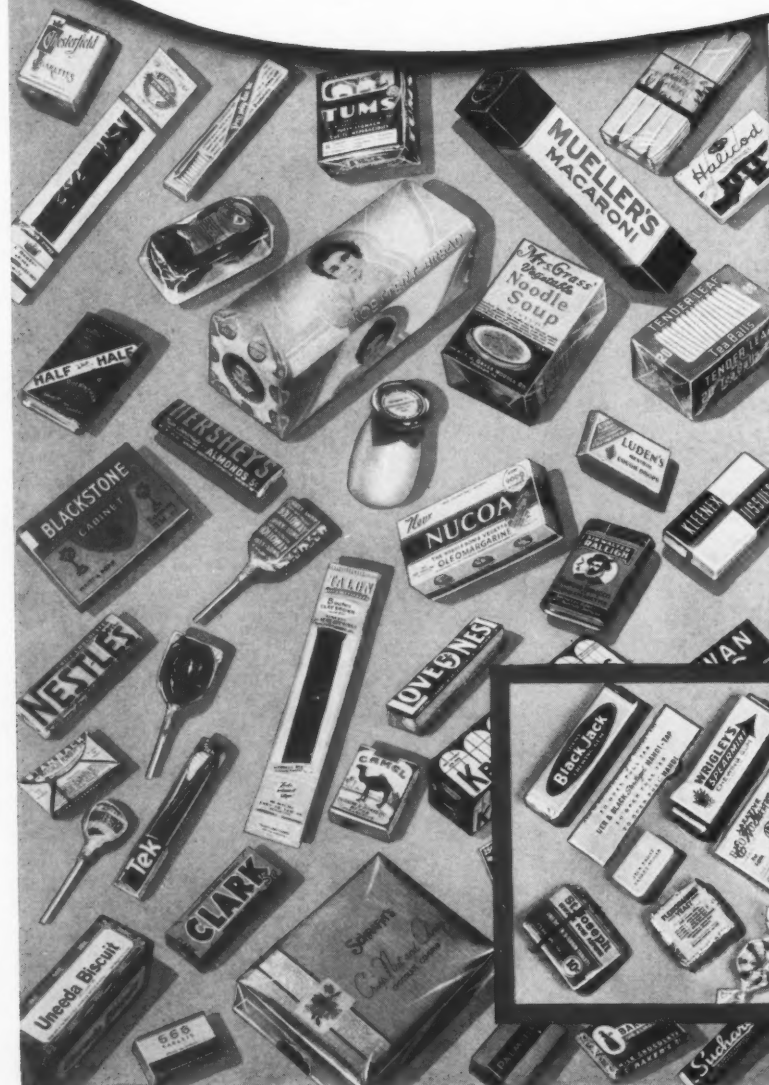
25 WEST 43rd STREET



NEW YORK, N. Y.



Here's Packaging



In addition to various models of machines for wrapping cartons, we have special machines for wrapping such products as

- chewing gum
- razor blades
- candy bars
- yeast cakes
- small pieces of candy
- lump sugar
- cigars
- tape bandage

Also machines for *bundling* cartons in lots of 24 or less. Machine bundling replaces costly cardboard containers and also makes large savings on labor cost. It is, therefore, widely used.



Experience for you

We have more than
70 models of
wrapping machines

Many of the products shown here bear names worth millions—and the packages which take them to market must be worthy of maintaining such a valuable business asset.

Examination of these packages will show that in each case the package is ideally suited to the product—both in appearance and utility... This is the kind of sales-winning packaging our machines are noted for—and the reason why they are used by such a large percentage of America's package goods manufacturers.

With more than 70 different models available, we are in a position to meet practically every wrapping requirement. Most models are quickly adjustable for more than one size of package, and are adaptable to practically any type of wrapping material. This extreme flexibility has proved of immense value to package goods manufacturers in adjusting their packaging to wartime requirements. In numerous cases our machines were readily adapted to the wrapping needs of products for which they were not originally built.

Though the war has restricted the delivery of wrapping machines, development work by our Engineering and Designing Department is still going on. In fact, the wartime problems we have to solve are providing an excellent source of ideas which can be introduced when machines are again freely delivered. So if you are planning any new improvements, call on us for suggestions.

Write or phone our nearest office

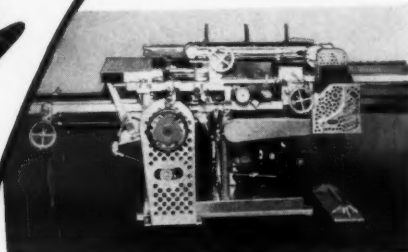
PACKAGE MACHINERY COMPANY SPRINGFIELD, MASSACHUSETTS

NEW YORK CHICAGO CLEVELAND LOS ANGELES TORONTO

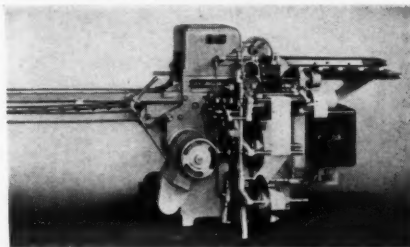
Mexico: Agencia Comercial Anahuac, Apartado 2303, Mexico, D.F.

Argentina: David H. Orton, Maipu 231, Buenos Aires

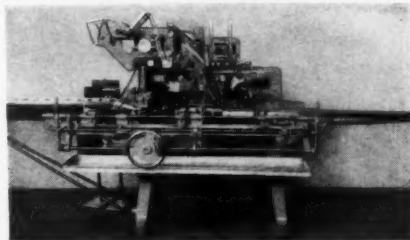
England: Baker Perkins, Ltd., Peterborough Australia: Baker Perkins, Pty., Ltd., Melbourne



Model FA—Most widely used wrapping machine. Quickly adjustable for extremely wide size range. Handles open boats and flat objects as well as cartons. Uses any type of wrapping material.



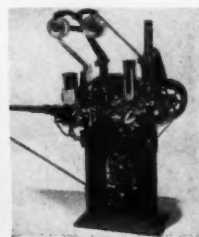
Model DF—A new machine built especially for wrapping irregular shaped candy bars. All forming and end-folding of wrapping material is done over breaker bars and tuckers, producing a uniformly sized, perfectly formed wrap irrespective of product shape.



Model CA-2—Completely automatic machine for wrapping chocolate bars and other products. Handles printed foil, glassine, cellulose and other materials in roll form, making combination type wraps. Electric Eye locates printing. Adjustable for various sizes.

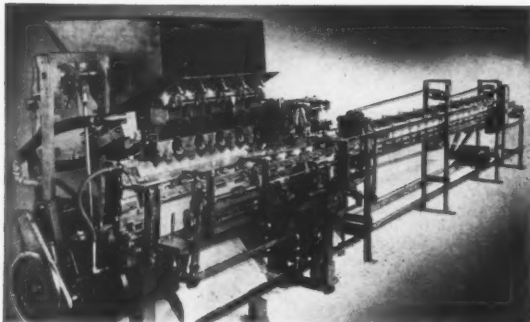


Model CM-T—The machine that wraps leading cigarette packages in Cellophane, with easy-opening tape. Speeds up to 250 or more per minute.



Model AC—Makes the standard chewing gum package, including Cellophane wrap with easy-opening tape. Operates at 600 sticks per minute.

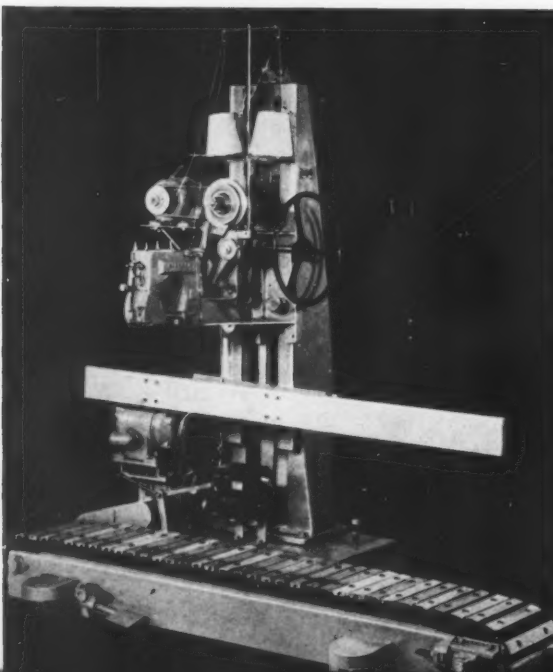
Bag Filling and Sealing



1



2

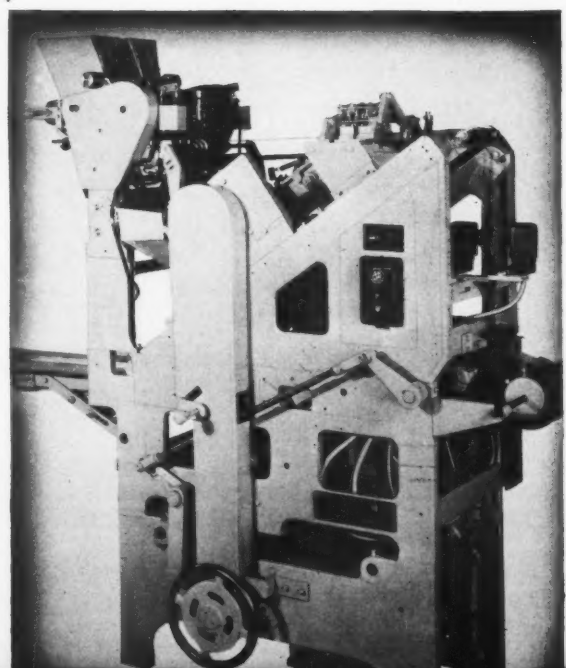


3

AUTOMATIC and semi-automatic equipment for the efficient closing of stiff containers such as has been available for many years, formerly made it almost imperative for the large producer of packaged goods to seek some form of stiff container, either a can or carton. Although the cost of these containers was considerably higher than that of paper bags, the saving in production cost frequently more than equalized the excess cost of the package itself. Thus, in most cases, the bag remained the unit for only the small producer who utilized all hand operations or combined hand or semi-mechanized bag opening and sealing operations with semi-mechanized or automatic filling operations.

Today the automatic machinery available in this field is capable of performing one or all of the operations included in the following list: bag feeding, bag forming, bag opening, bag filling, check-weighing, bag closing and bag sealing. Developed in almost every case to

1. Automatic bag feeding, weighing and filling, top folding and gluing machine. Photo U. S. Automatic Box Machinery Co. 2. Duplex bag packer and weigher (in background) feeding to an automatic type bag sealing machine. Photo Stokes & Smith Co. 3. Machine for bulk packing of large bags. Photo Bagpak, Inc. 4. Machine for forming, filling and top-sealing of cellophane bags at rate of forty-five per minute. Equipped with double net weighers. Photo Richard Machine Co.



4

"Start to Finish" PACKAGING SERVICE

Pneumatic packaging hook-ups are designed, engineered, built, and serviced by us to give you fast, efficient, uninterrupted production.



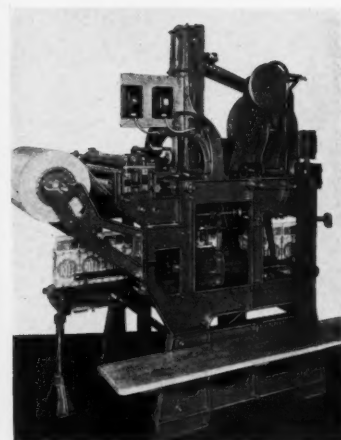
SEMI-AUTOMATIC ALL PURPOSE WEIGHER—two models for 2 oz. to 3 lb. loads of peas, beans, all grinds of coffee, rice, etc., in bags, tins or cartons.

Over 80 different automatic and semi-automatic machine models for:

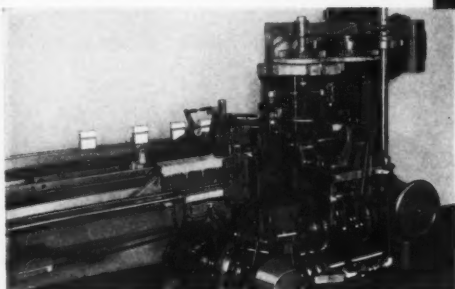
Carton Making	Lining
Feeding	Filling
Forming	Weighing
Bottom Tucking	Packing
Bottom Sealing	Lining Closing
Top Tucking	Tight Wrapping
Top Sealing	Labeling
Wax Tight Wrapping	

ALSO:

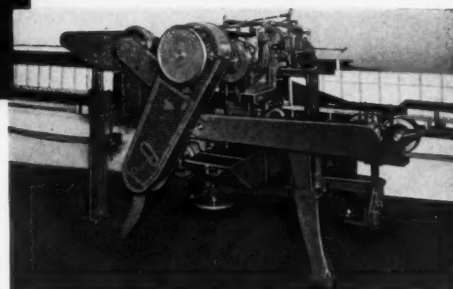
Bag Flour Packers	Can Fillers
Double Package Makers	Can Cappers
Tea Baggers	Can Labelers
Shoe Box Machinery	Powder Fillers



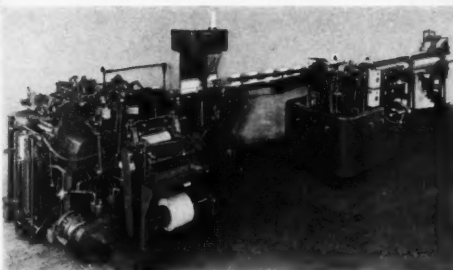
CARTON LINER—cuts glassine, waxed or plain papers from a roll, then forms, seals and inserts the bag.



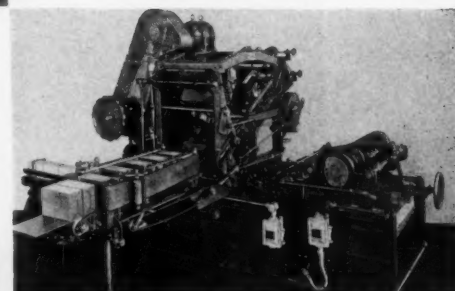
HI-SPEED CARTON FEEDER & BOTTOM SEALER—one of nine different models for feeding, forming and bottom sealing or tucking cartons at speeds ranging from 10 to 105 per minute. All models adjustable for different carton sizes within certain limits.



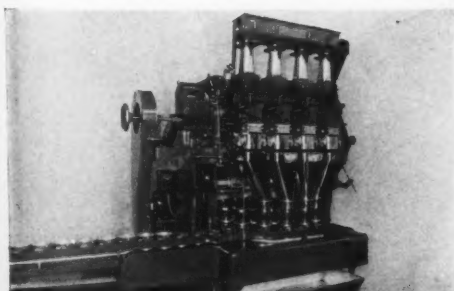
TOP SEALER—for glue-sealing tops of cartons. Other models available for folding liners and top tucking at speeds ranging from 25 to 100 per minute.



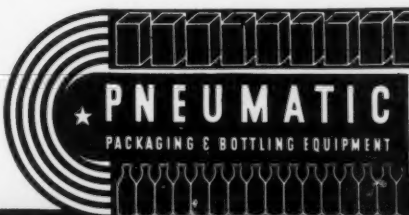
DOUBLE PACKAGE MAKER, AUTOMATIC FILLER & ROTARY TOP CLOSURE—a complete 3 machine hook-up for producing a package within a package. Pneumatic's new Double Package consisting of a printed carton with individual inner bag liner offers added insurance for your product against loss of flavor and freshness. An ideal container for dried fruits, pudding powders, gelatin desserts, confectioners sugar, prepared flour, individual servings of cereal, tea, coffee, etc. Send for a sample package today.



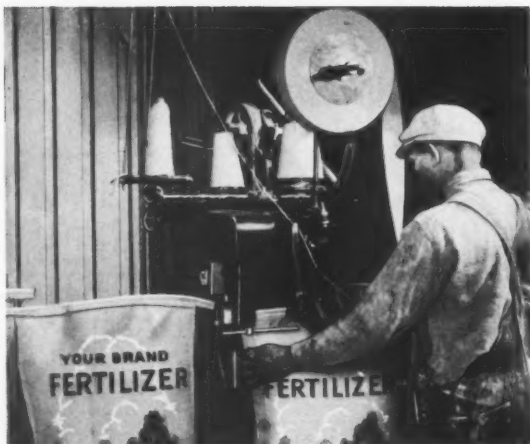
TIGHT WRAPPER—one of four machines for gluing printed tight wrappers to shells. Entire inside surface of wrapper is glued to insure strong silt-proof, insect proof package. Speeds from 40 to 70 per minute are entirely practical.



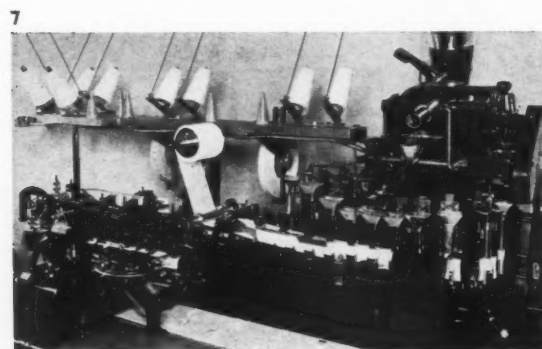
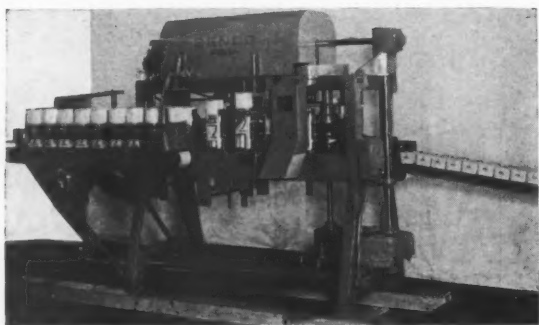
FOUR SCALE NET WEIGHT COFFEE WEIGHER—one of Pneumatic's 25 different types of gross and net weight weighers for handling free flowing and semi-free flowing materials. Speeds range from 10 to 100 per minute.



PNEUMATIC SCALE CORP. LTD., 77 Newport Ave., North Quincy, Mass.



meet the specialized needs of a single producer or a single industry, these machines have come to form a group in themselves. Since differing machines perform differing groups of operations, no single description will cover the entire field. A perusal of the photographs and captions which illustrate this article will, however, give the reader a pretty fair idea of the possibilities inherent in such machines. The introduction of automatic bag packaging machinery has, in some industries, resulted in a surprising change in the appearance of the bag itself since the automatic machine is capable of producing a bag closely approaching in appearance the neatness and attractiveness of the finest stiff containers. With this possibility, bag suppliers and bag users have turned from the cruder forms of bag decoration to the use of the more attractive and decorative outer bag materials.



5. Tape sealer, sews heavy cotton cord over closing tape. Handles twelve or more bags per minute. Photo Bemis Bro. Bag Co. 6. Bag closing machine handling folded gusset bags, adding tin tie and sealing same. Photo Benj. C. Betner Co. 7. Tea bagging machine which forms fabric bags, fills them, sews closure and applies string and tag. Photo Pneumatic Scale Corp., Ltd. 8. An automatic bag opener, feeder with weigher attaining a speed of thirty bags per minute. Photo B. F. Gump Co. 9. Close-up view of the automatic bag sealer weighing unit, and discharge settling conveyor at plant of Albert Ehlers Co. Photo Consolidated Packaging Machinery Corp. 10. Vibratory feed weigher, conveyor and loader; capacity 25 to 30 bags per minute. Photo Triangle Package Machinery Co.

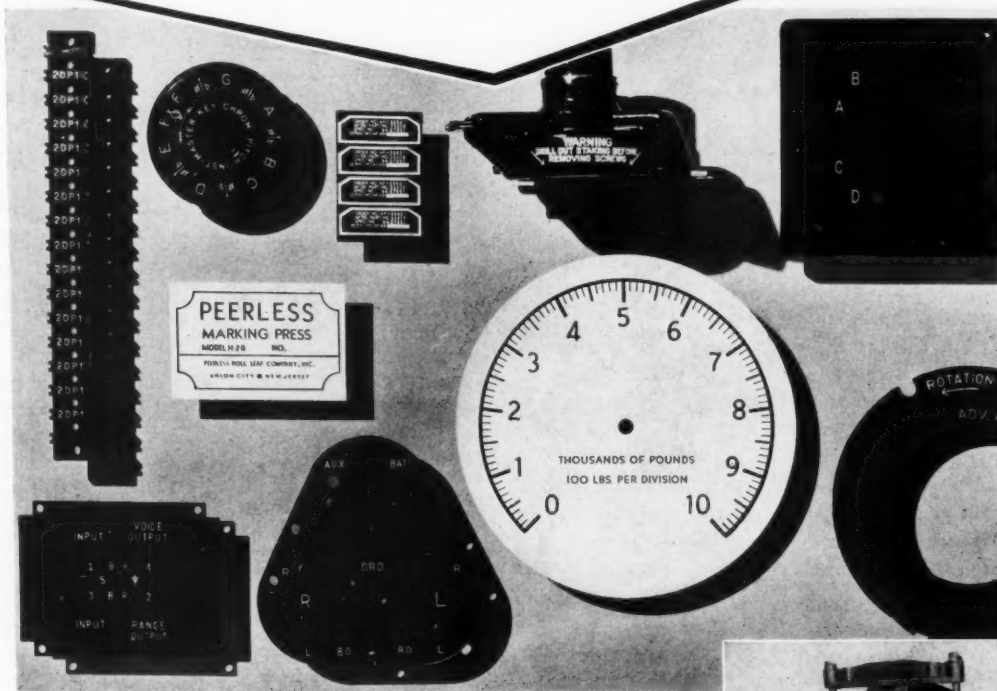


IF YOU HAVE TO MARK PRODUCTS

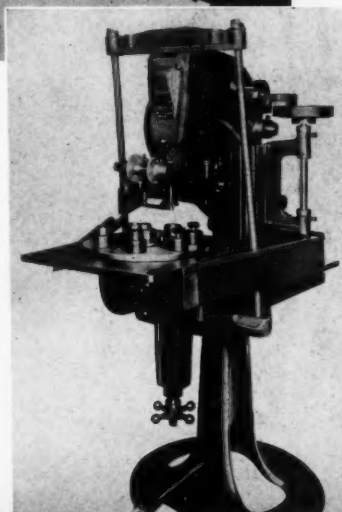
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Box and Bag Stapling Equipment

THE use of stapling, as a means of closure for bags and boxes, has shown a great development during the past few years, furthered by the wide variety of stapling equipment that has been produced to meet specific requirements. Bag sealing with staples has grown from a spare time job of retail clerks until whole departments are now devoted to this particular operation. Whereas hand operated machines were used, and still are, power-driven staplers and stitchers are effecting great savings in the packing and shipping departments themselves.

Among the advantages of stapling as a method of closure is the fact that it is neat, secure and very fast. It does not impair the appearance of the container and the container may be used immediately, without waiting for an adhesive to set. Dampness does not cause the seal to loosen, with the danger of the contents spilling out and it is practically impossible to remove the staple and again seal the package without detection, thus reducing the danger of pilferage to a minimum.

Four types of closure are generally used in this bag sealing work. The simplest form is where the bag is merely folded over at the top and fastened with one or two staples. Another method is the use of a cardboard bag top which folds over the top of the bag and is stapled through the bag, thus making a seal and furnishing a label at the same time. Where the bag is to be folded tightly over the contents, as in the case of a coffee bag, sometimes the two sides are folded in first

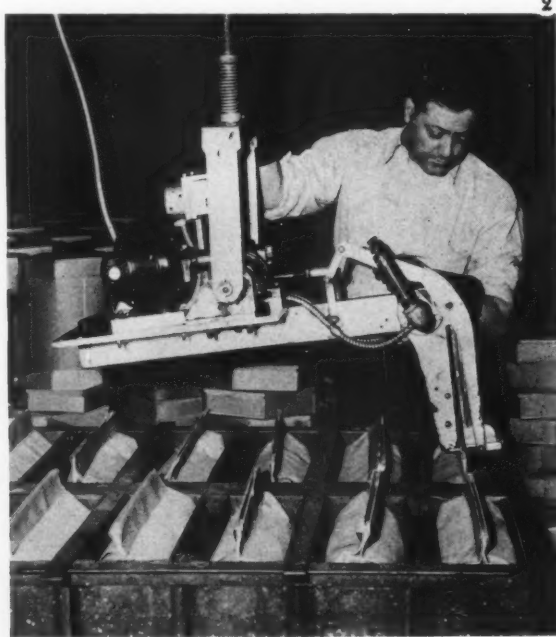
and then the back and front folds lapped over each other and stapled with a single staple. When a non-sift seal is desired, a wide fold is made across the top of the bag and this fold is folded again, the sides being folded under at the same time. By inserting a stapling machine under the two ends of this fold successively and driving a staple in each end, a flat top, non-sift bag is produced.

Packers of asphalt, fertilizer and other heavy bulk products, who use multiwall paper bags, have discovered that stapling is an efficient and economical means of sealing these bags, too, and bags up to 100 lbs. capacity are handled easily and quickly on equipment especially designed for this purpose.

A very recent development in packaging is the heavy kraft shipping bag, which is used as a shipping container for coffee and other items, carrying 12 or 24 1-lb. bags. This container is especially adapted to motor transportation and is widely used by packers operating their own fleet of trucks. When filled, the sides of these bags are folded in and the back and front are then folded over each other and stapled with a hand-operated or foot-operated machine, depending upon the preference and needs of the packager.

Users of corrugated containers have widely adopted stapling methods. Foot- or motor-operated bottom staplers and stitchers are used to seal the bottom flaps, while specially designed top staplers and stitchers are used on the tops. Some of these top staplers make use of

1. Machine for seam-stitching shipping containers. Photo Acme Steel Co. 2. Multiwall paper bags sealed by automatic stapling device where tops of bags are headed with cardboard reinforcement. Photo Bostitch, Inc.



Model 4



TERKELSEN WRAPPING MACHINES

TERKELSEN MACHINES for wrapping securely either coils or straight lengths are being used by many of the largest mills in the country.

This equipment offers an effective method for doing the job quickly and efficiently at the minimum cost. The machine shown above wraps coils only. This type machine is made in many sizes and types to wrap the smallest or the largest coils. The picture shows the application of two materials simultaneously. Also a periphery strip of paper is being applied around the periphery of the coil.

The machine shown below wraps coils or straight lengths. The tables can be furnished in any desired length.

Machines use standardized paper rolls and the preference of users is Rinkle Krinkle Paper.

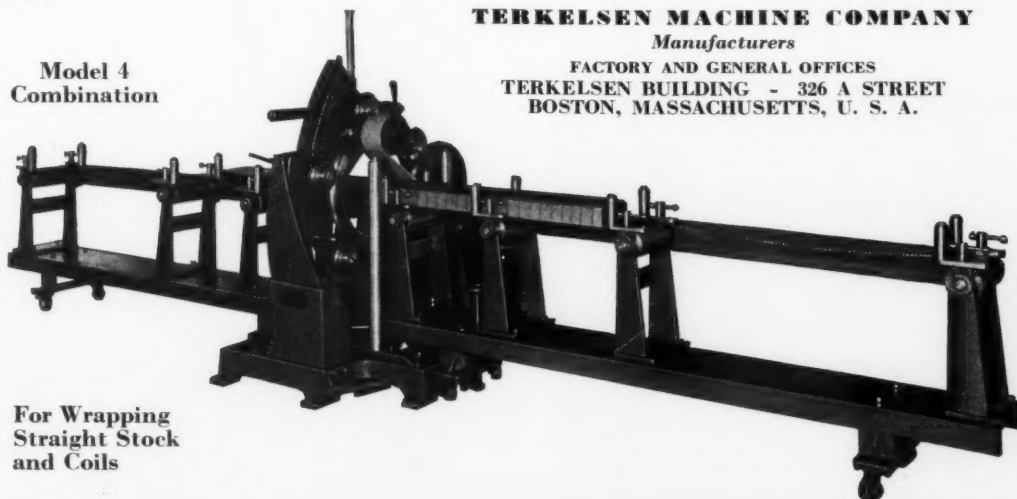
TERKELSEN WRAPPING MACHINES are made in many types and sizes for all spiral wrapping applications. Simplicity of operation is a feature of construction. Machines twenty-eight years old are still in daily use.

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TERKELSEN MACHINE COMPANY *Manufacturers*

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Model 4
Combination



For Wrapping
Straight Stock
and Coils

a sealing blade which is inserted under the flap and a more modern development is a top sealing stapler which is operated from the outside of the closed container, closing its staple entirely from the outside and requiring the insertion of no sealing blade.

The smallest machines used for bag stapling can be operated in the palm of the hand. There are heavy duty hand models of larger size, as well as a wide range of foot and motor driven machines all the way up to large automatic box stitchers. Complete information is available in the industry and it is an easy matter for the user to obtain the equipment that is exactly suited to the requirements of his particular work.

One of the widest uses of stapling in recent years has been in carding for display. Items of merchandise that are too small to possess sufficient attention power or to carry adequate sales information are stapled to cards which present the message to the consumer. Such cards serve to identify the brand and the manufacturer, to convey a selling message that the article itself is too small to carry and the sales person too busy to tell, to carry directions and explanations that insure the proper use and care of the product, to advertise other items made by the same manufacturer, and to discourage pilferage, in the retail stores, from counter displays.

Practically any item that can be embraced by a staple can be carded in this way. Bottles or other fragile merchandise can be safely and quickly handled, because the pressure of the stapling machine can be accurately controlled without variation and the staple can be firmly clinched with no appreciable pressure whatever on the object being enclosed.

3. Hand stapler for applying white linen labels to burlap bags. Photo Bostitch, Inc.
 4. Special type of stitcher for the closing of heavy duty multiwall paper bags. Photo Acme Steel Co.
 5. Machine for bottom stitching of shipping containers. Photo Morris Div., Harris-Seybold-Potter Co.
 6. Stitcher with anvil for sealing coffee bags. Photo Bostitch, Inc.



Speed is a big factor in stapling. Whether operated by hand, foot or electric motor, the stapling machine clicks out the staples as fast as the operator can handle the work. Every click completes a stapling operation. It is much faster for most kinds of bagging and carding than tacking, riveting, gluing, hinging, sewing, hooking and taping operations—operations which involve materials of all kinds. There is no waiting for an adhesive to set and the staple will hold regardless of temperature or moisture. Furthermore, stapling machines are portable and can be placed wherever most convenient for the work in hand. For example, in retail stores, where pre-packaging is to be done by clerks in odd moments, hand-operated machines are used on each counter where the work is handled. Manufacturers and distributors can better concentrate their work and more often use foot or motor driven machines for both packaging and display.

The automatic-feed staple-hammer is also widely employed in packaging and shipping operations. Driving a staple like a double-pointed tack, with each single blow, this hammer is an efficient time saver.

On large production, wire stitchers instead of staplers are often used. A stitcher, in the parlance of the industry, is a machine which makes its own staples from a coil or spool of wire. Each operation of the stitcher-head drives a staple and forms another one, ready for the next stroke. Newer types of stitchers are portable and can be easily placed wherever most convenient for the work on hand.

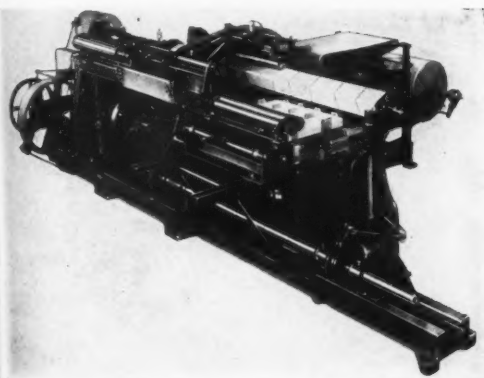


The "ANSWER" To Your Packaging Problems— PAPER BODY CANS!

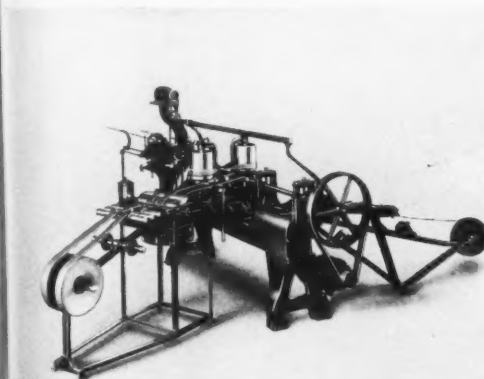
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Automatic Convolute Fibre Can Winder



Knowlton Spiral Tube Winding Machine

For "Better Dressed" Packages that Conserve Critical Materials...Choose KNOWLTON PAPER CAN MACHINES

These versatile Automatic Paper Can Machines incorporate a host of special features which are acclaimed as revolutionary by manufacturers and packers alike. The parts these Knowlton Machines are playing in the conservation of critical materials and the solving of packaging problems are mighty important ones, and they perform them in an amazingly simple and economical manner.

The Knowlton Automatic Convolute Winding Machine accepts paper stock from the roll and automatically produces paper can bodies in round, rectangular, or irregular shapes—applies the adhesive, and lithographs labels, and delivers the completed can bodies ready for the seaming-on of either metal or paper tops and bottoms.

This machine is equipped with an automatic slitting and labeling attachment which permits production of from one to five complete can bodies at a time during the winding process. It produces paper can bodies in multiple lengths up to 20" in height, and with diameters ranging from 1 3/4" to 9" for cylindrical and from 1 1/2" to 9" across diagonal corners for irregular shaped paper can bodies.

The Knowlton Spiral Tube Winding Machine is another example of modern efficiency. It is the fastest and most economical machine for winding paper tubes or cores ranging from two to twenty-one plies and its product is unsurpassed for tube strength, accuracy and high quality. It is the natural choice for the making of food containers, cosmetic boxes, tissue cores, heavy mill cores, mailing tubes, dry battery cores, spools, etc.

For more complete information as to how Knowlton can help you solve your packaging problems, write or call our nearest office.

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Case Packing and Sealing Machinery

CASE packing equipment for can packing consists essentially of a series of inclined runways which receive and gather cans as they roll off the conveyor lines, until the proper number of cans have been assembled to fill one layer in the shipping container. The cans are then pushed, horizontally, into the container by a hand or electrically-operated device. If the container is of a type to accept more than one layer of cans, this operation is repeated a sufficient number of times.

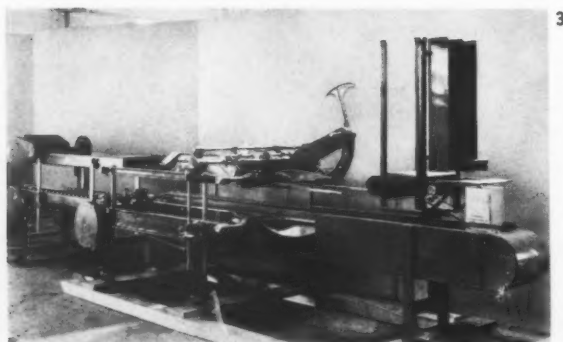
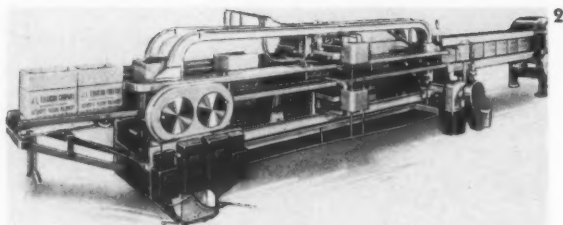
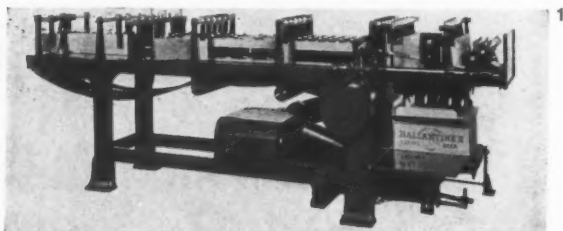
Bottle casing units work on a similar principle, but use a vertical drop, rather than a horizontal push, to effect entry of the packages into the shipping container. Bottles come off the conveyor lines and are gathered over a grid which correctly positions them. At the proper moment, and under the control of the operator, the bottles drop into the shipping container which has been automatically raised until it rests just under the grid.

Carton packers have also been developed, working on principles very similar to those of the can packer with the exception that the rolling action of the can is replaced by a pushing action to get the various rectangular cartons into the proper position before placing the cans, en masse, into the shipping container.

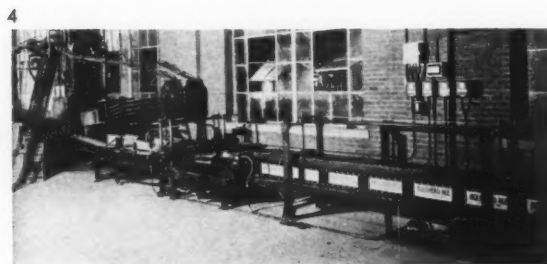
Once packages have been packed—by hand or by machine—it becomes necessary to seal them firmly for shipment. The simplest devices for this purpose are the hand glue sealers, which are simply adjustable pressure units mounted on top of roller conveyor sections through which the hand glued cases are passed.

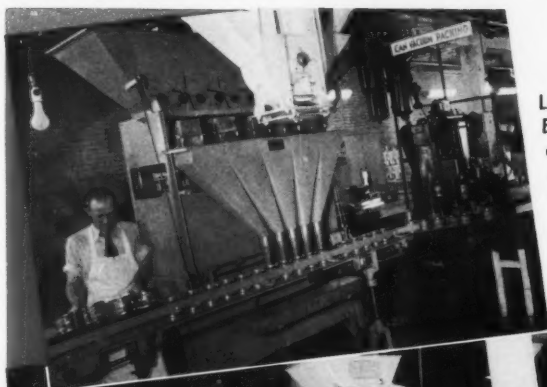
Case gluing and sealing units of an automatic type receive filled, but unglued cases directly from the conveyor line and apply adhesives to both the top and bottom flaps of the cartons with the goods already packed therein. They then fold the flaps into closed position and pass the sealed containers through a compression unit, where the glue sets. Speeds of from 200 to 1,200 cases per hour are practical on such automatic equipment. Such machines may be equipped to seal and glue top flaps only, as in the case of shipping containers for bottled goods which have previously been used to carry the bottles from the glass plant to the packaging plant.

The machines are completely automatic, require no operators and are adjusted to start in motion whenever a case is presented to the machine by the conveyor line. Many machines are equipped with photo-electric cell devices to prevent jamming of cases.



1. Case loader for beer bottles. Conveyor delivers bottles to grid which positions them. 2. Automatic top and bottom case sealer. 3. Automatic top and bottom gluer with compression unit. 4. Packer and sealer handling beer cans and cases. 5. Case loader for can packing. Photos 1, 4, Standard-Knapp Corp.; 2, 3, J. L. Ferguson Co.; 5, Burt Machine Co.

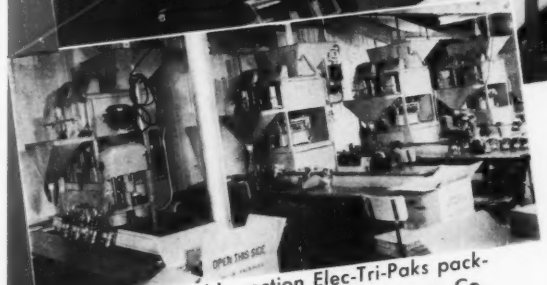




Left: Five-section Elec-Tri-Pak Weigher automatically filling coffee cans at Morey Mercantile Company, Denver, Colorado.



Left: Triangle Elec-Tri-Pak Weigher and SR Carton Sealer packaging bread crumbs at Ward Baking Co., Cleveland plant.



Above: Four double section Elec-Tri-Paks packaging cranberries at A. D. Makepeace Co., Wareham, Mass.



Below: Triangle Auger Packer filling spices in cans at David G. Evans Coffee Co., St. Louis.

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PACKAGING CATALOG 447

Materials Handling Equipment

CONVEYING equipment is the basic part of the high speed, mass-production process increasingly being called into use to step up defense needs. It is of vital importance in cutting handling time, avoiding wasteful waiting for materials and increasing plant capacity. Installed at strategic points in a production system, conveyor equipment handles incoming material, moves work in process and delivers goods to shipping and storage, thus helping hundreds of manufacturers to make man-power and man-hours more productive.

In mechanized materials-handling—as in processing and packaging operations—there is a one best way for doing every operation and a most effective method of combining operations in a smooth sequence. These call for two distinct but smoothly meshing mechanical systems or, considered in its broadest aspect, of two separate parts of a single mechanized-handling system.

First: the mechanical means used for moving the goods and for insuring a continuous, automatic flow of all ingredients, bottles, boxes, and cartons from the receiving dock, on through the plant and out to the shipping dock again.

Second: the mechanical means by which the progress of this flow is so directed and supervised that component parts meet at designated times and places; the materials from each feeder line joining those from every other feeder line and moving along to stock room or shipping dock, as a single flow.

Experience in thousands of plants has proved that one of the best ways to obtain continuous flow movement is by combinations of conveyor lines so varied in type as to meet the necessary changes in flow direction; such as horizontal, grade, radius, vertical ascent, vertical descent, two-way, overhead or floor; and changes in form of materials moved; such as raw ingredients, semi-pro-

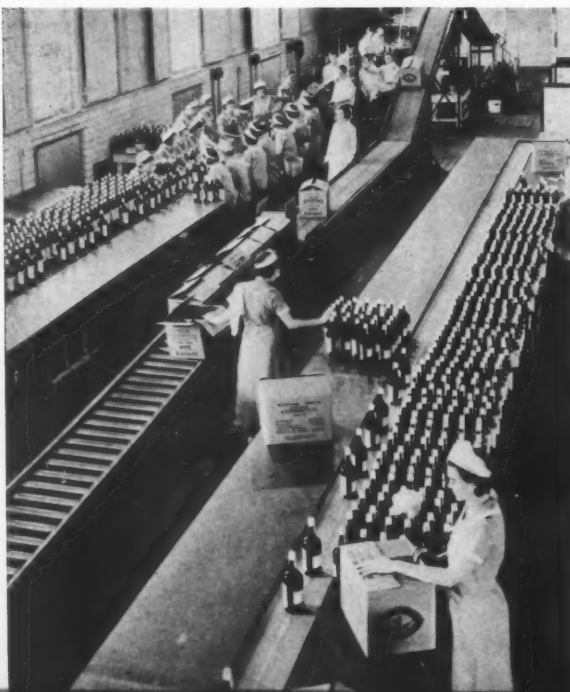
cessed ingredients, bottles, bags, boxes, cartons or cases.

Likewise experience has proved that one of the most effective methods of coordinating and synchronizing these conveyor lines is by means of pneumatic dispatch tubes with a central terminal in the planning department, manufacturing office or laboratory, and tube stations at various points where one operation blends into another.

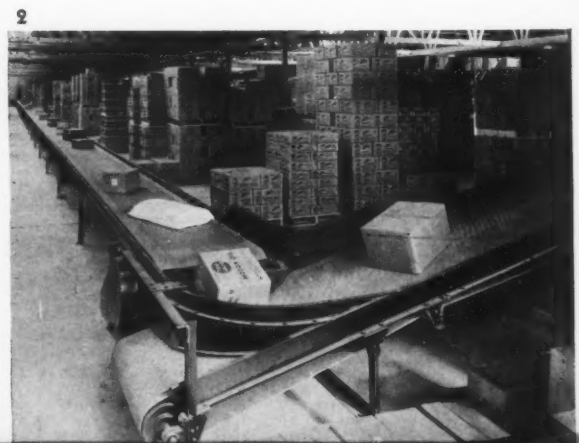
These two integrated systems—or parts of a system—not only mesh smoothly and accurately in their own operation, but they provide an effective method for getting practicable standards of "unit-time" performance per man and per machine. They are an effective method for establishing a routine of preparation, operation, and control that will insure constant maintenance of the conditions under which work standards are set up. And they are effective for working out such mechanisms as routing, order-of-work, instruction cards, purchase of materials according to use, maintenance of limits in central stores and the controlled conditioning and delivery of materials, tools, containers and the like.

A large wholesale drug company installed a combination gravity roller conveyor and belt conveyor to handle their merchandise, and a pneumatic tube system for dispatching papers throughout the plant. A central desk was installed on the second floor, right in the heart of their order-filling, invoice-making, item-pricing clerical department. This efficient tube system and one employee have taken the place of ten boys.

The roller and belt conveyor system has increased the volume of this drug plant 50 per cent over what it was before they adopted mechanical devices for speeding up their service. The conveyors cost this wholesale drug house \$7800 installed, and the pneumatic tubes \$4200. They now save them \$18,000 or \$20,000 a year which they can trace directly to this combination system. A recent addition to their present system, at a cost of \$15,000 was expected to save them double that in the first year.



1. Inclined and level belt conveyors, stainless steel work tables and gravity roller conveyor used in cartoning of bonded liquor. Photo Mathews Conveyor Co. 2. Junction, level to incline belt. One of eight 200-foot order pickers' belts at loading height. Photo Lamson Corp.



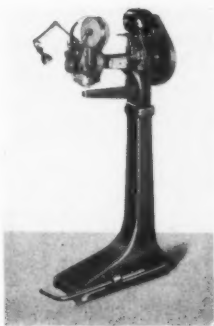
DEXTER FOLDER COMPANY

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Wire Stitching Machines for Stitching Shipping Containers, Folding Boxes, Set-Up Boxes, Bags, Etc.



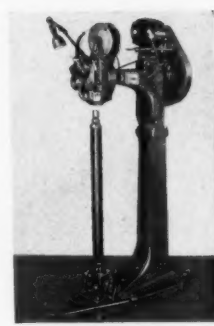
BLISS HEAVY DUTY BOX STITCHER

For stitching corrugated and solid fibre shipping cases, folding boxes, set-up boxes, food containers, display boxes and similar work. Bliss straight or 45° Heavy Duty Stitcher Head mounting, for handling the heaviest kinds of stitching at high speeds. Uses all ribbon and hybar wires and other round and flat sizes. Wide clearance ($1\frac{1}{8}$ ") between head and anvil. May be equipped with tables and gauges for special work. Throat lengths 15", 25" and 33".

BLISS HEAVY DUTY BOTTOM STITCHER

For bottom stitching regular slotted containers in all grades and thicknesses of corrugated or solid fibre board, and where maximum production is required.

Operates at speeds up to 300 stitches per minute. $1\frac{1}{8}$ " clearance between post and stitcher. No adjustments for size of containers within its range. Built for long service on heavy duty work. Stitcher head detachable as a unit. Built in two sizes: 15" or 25" throat. Can be furnished to handle the usual sizes of box wire.



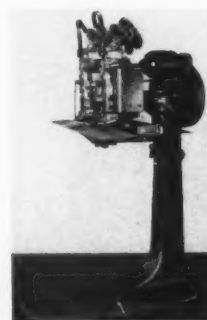
IMPROVED LATHAM BOX STITCHER

Moderately priced machine for stitching the regular run of folding boxes, set-up boxes, suit boxes, paper bags, bottle carriers, display boxes and similar work. Also lighter weights of corrugated and solid fibre shipping containers. Uses .017 or .020 ribbon wire and No. 1 or No. 2 hybar wire. High speed. Throat length 12".

IMPROVED LATHAM BOTTOM STITCHER

Moderately priced machine, for bottom stitching corrugated and solid fibre shipping containers, in all the usual sizes, which do not require the heaviest kind of stitching. Has many features heretofore found only in highest priced stitchers. Stitcher head removable as a unit. 12" throat length.

Uses .017 to .020 ribbon wire; No. 1 or No. 2 hybar wire.



BOSTON MULTIPLE HEAD BOX STITCHER

May be equipped with two to four No. 15 Heavy Duty Boston Heads. Adjustable sideways as desired. For stitching suit boxes, cartons, set-up boxes and other work requiring two or three stitches uniformly spaced. Uses ribbon, hybar and flat or round wires. Capacity up to $\frac{1}{2}$ " thickness. Minimum spacing of 3" from center to center of stitches. Maximum spacing 18"; 15" throat length.

BLISS DUPLEX BOTTOM STITCHER

Drives two stitches simultaneously, increasing production 50% to 60% over single head stitchers. Popular in plants handling large quantities of containers for canned goods, bottled goods, soaps, etc. Stitches spaced $2\frac{1}{2}$ " apart. No adjustments for various sizes of boxes within its range. Uses Bliss Duplex Stitcher Head. Throat length 15". Stitches 2500 to 4000 boxes daily.



BOSTON PORTABLE BENCH STITCHER

This stitcher may be taken to the work, rather than have the work carried to the stitcher. Intended for light stitching operations, such as sealing filled bags, attaching articles to cards, and making small boxes. Readily moved and attached to light socket. Solenoid operated foot trip, or may be furnished special for tripping by the work being stitched. Capacity $\frac{1}{4}$ ". 21 x 25 flat wire used. Throat length 4".

DEXTER ENGINEERING SERVICE

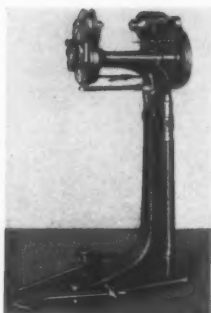
The Dexter Folder Company maintains a corps of engineers who have had extensive experience in packaging and preparing for shipment a great variety of products.

The services of our organization are available, without obligation to you, for making a survey of your packing and shipping departments to determine the most economical methods of handling and protecting your goods while in storage and transit—when they are no longer under your control.

Ask for literature on any of the stitchers shown here.

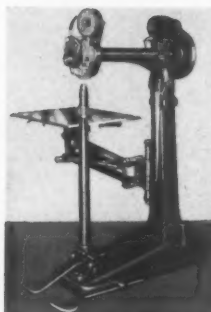
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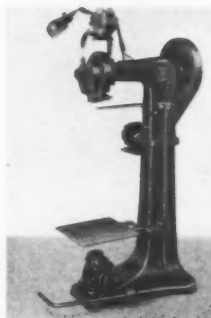
BLISS COMBINATION BOX AND BOTTOM STITCHER

A general purpose machine which can be used either for regular box stitching by use of the box arm, or for bottom stitching of containers by use of the post. The box arm may be lowered and post placed in operating position. Output is the same as obtained on Bliss Box Stitcher or Bliss Bottom Stitcher. Built in two sizes, 15" or 25" throat. The Bliss Heavy Duty Stitcher Head is used.



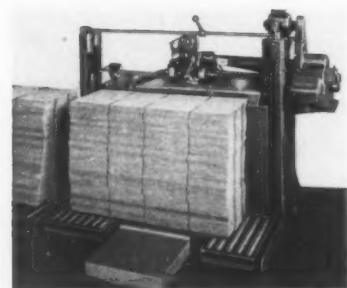
BLISS TOP AND BOTTOM STITCHER

This combination machine is used for both bottom stitching of slotted containers, and for top stitching them after they are filled. Change from bottom stitching to top stitching quickly made. Handles boxes up to 25" in depth and from 15" square for smaller machine to 33" square for larger machine. Useful for products that must be shipped in completely wire stitched containers. Equipped with Bliss Heavy Duty Head. Made in three sizes, 15", 25" and 33".



LATHAM BOX, BOTTOM AND TOP STITCHER

This combination stitcher is adapted for stitching bottoms and tops of medium and small boxes, used in small or large quantities. Also for assembling and stitching a variety of boxes. Vertical post for bottom stitching, box arm for box stitching, or blade anvil for top stitching, are quickly detached or placed in operating position. Table accommodates boxes from 2" to 33" in depth and from 12" x 12" square to 3" x 3" square.



BLISS AUTOMATIC RSC STITCHER

The Bliss Regular Slotted Container Stitcher with Dexter Automatic Elevator produces at rate of 1500 to 2000 average size slotted containers per hour with one operator. Elevator accommodates 3 1/2 foot pile of stock, and automatically keeps top of pile at feeding level as blanks are fed off.

Feed table is quickly lowered for next load. The folded blank pushed against a stop trips solenoid operated clutch, and blank is automatically fed through and stitched, with stitches evenly spaced in accordance with predetermined setting. Spacing of stitches is within a range of 1 1/2" to 3" between stitches. Tie stitches may be driven at each end.

Stitches wide range of sizes, representing approximately 90% of boxes produced. Uses Bliss Heavy Duty Head with 45° stitch. 3/4 H.P. motor for stitcher; 1/4 H.P. for elevator.

BLISS POWER LIFT TOP STITCHER

Recommended for top stitching large quantities of containers. Suitable for conveyor installations as table is adjustable to height of conveyor line, permitting filled containers to be transferred to the table without lifting. Power operated work table automatically stops in right position for top stitching. Equipped with Bliss Heavy Duty Stitcher Head. 33" throat length. One motor operates table and stitcher.



BLISS QUICK LIFT TOP STITCHER

Used for wire stitching the tops of regular slotted containers and Bliss Boxes.

The table is supported by the Bliss quick lift mechanism which is positive in action and instantly adjustable up and down. Raising and lowering of table is facilitated by the use of counterbalancing springs.

Equipped with Bliss Heavy Duty Stitcher Head. Built in three throat lengths, 15", 25" and 33", accommodating boxes up to 33" long, 33" wide and 28" deep.



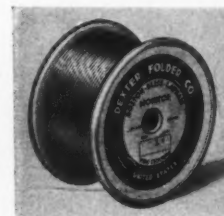
BLISS DIAGONAL HEAD RSC STITCHER

Drives stitches at 45° angle to the manufacturer's seam. The Bliss open head device is rigidly attached to the stitcher head casting and is self-supporting. Clincher anvil does not rest on the box blank, thus preventing crushing of corrugations. Clinching anvil available for stitching double wall A-B and A-A Corrugated boxes. Built in 32", 38" and 48" throat lengths. May be equipped with mechanical foot trip or with movable solenoid operated foot switch. Motor is 1/4 H.P.



WIRE, PARTS SERVICE

Under normal conditions replacement parts and the usual sizes of wire are carried at all Dexter offices, for prompt delivery. Due to the present emergency, these items are subject to priorities imposed. Mechanical services are available at all offices.



DEXTER FOLDER COMPANY

330 West 42nd Street, New York, N. Y.

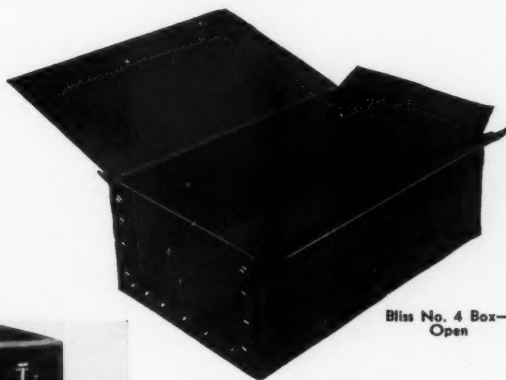
TYPES OF BLISS BOXES

The most popular types of Bliss Boxes are the No. 2, No. 4 and No. 4-2 models.



No. 2 Bliss Box—Open

When No. 2 Box is assembled, the flanges form a double thickness of board on all vertical seams on the sides, and on horizontal seams at each end of the box.



Bliss No. 4 Box—Open

When No. 4 box is assembled the three flanges form a double thickness on the ends, which gives added protection for canned goods and other commodities where an end thrust of the contents is to be guarded against.



This New Bliss Wire-Lock Seal Box may be sealed, opened for inspection and re-sealed without damage to the box.

Wire stitches with arched crown attached to top panel and body of box provide means for locking the cover with wire or strips of metal which may be sealed with lead seals. Such seals are readily broken without damage to the box and after inspection or repacking new seals may be applied. This box, with arched wire seals attached, is manufactured by leading container companies.



No. 2 Bliss Box—Sealed



No. 4 Bliss Box—Sealed

ADVANTAGES OF BLISS BOXES

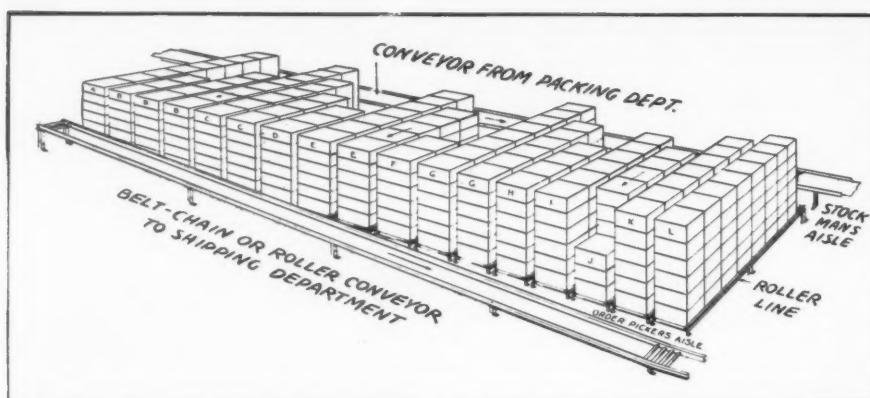
Packing goods in BLISS BOXES assures the manufacturer of the greatest possible margin of safety to his goods while stored and in transit. The three-piece construction, with all vertical seams reinforced, makes the BLISS BOX the strongest corrugated or solid fibre container obtainable.

The special method of construction of the Bliss Box offers greatly increased resistance to all types of

stresses, whether from within or without the box.

Bliss Boxes are economical because they contain no waste stock. The saving in material and freight charges reduces the total cost an average of 10% and in some instances as much as 20% when compared with other types of fibre containers. The extra strength of the BLISS BOX also often permits the use of lighter board which effects an additional saving.

Blanks for BLISS BOXES are manufactured by nearly all leading board mills and box factories in the United States and Canada and are therefore as readily obtainable as other types of shipping containers. A complete list of manufacturers will be furnished on request.



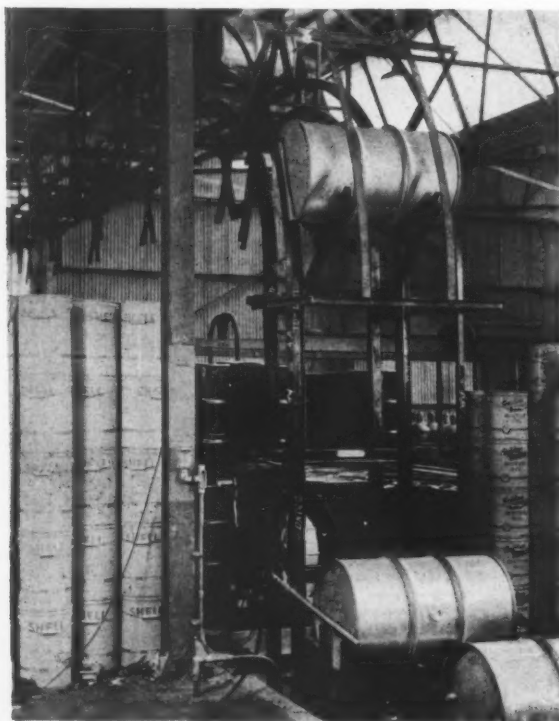
3. This basic principle of stock storage eliminates trucking and handling aisles between piles; increases storage capacity and makes supervision and inventory control easy. Sketch Lamson Corp.

Naturally the dispatch-tube part of the system is the simplest. It varies only according to the size and shape of the carriers and tubes required to handle the various papers and records. The conveying systems are most complex. They must meet a much wider range of plant and process conditions, but thanks to modern conveyor engineering which has reduced virtually every handling problem into simple components that can be handled by combining standard types of conveyors little, if any, special designing has to be done in fitting today's conveyors to conditions in the modern packaging plant.

Types of conveyors

The standard conveyors break down into eight classifications. They are as follows:

4. Continuous chain conveyor for elevating and lowering oil drums. Photo Standard Conveyor Co.



Gravity roller conveyors: Using only gravity as motive power, these conveyors consist of a series of free-turning rollers mounted in a rigid frame. The rolls are made in various sizes to accommodate various loads, and they are light enough so that even empty cardboard boxes will overcome the inertia of the roll tube and the roller bearings.

Gravity chutes: Made of structural steel and sheet metal, these chutes confine the load and reduce the speed of short travel from an upper to a lower level. Spiral chutes are used for longer drops and in places where space is limited. Some spirals have gravity roller sections, and some even are operated by power.

Live roll conveyors: Similar to the gravity roller conveyor, this type employs mechanical means to power the rolls. Power belts are snubbed against the under side of the rolls under tension supplied by snubbing rolls and sheaves located between the carrying rolls. Flat belts are used for straight travel, and round belts for curving travel. Chain types driving through sprockets on the rolls are also employed. Roller spirals, as mentioned above, can be powered with round-type belts, thus enabling continuous flow down declines of loads of varying weights, with no danger that fragile loads will be crushed between heavy loads. Loads also can be elevated in this manner without necessity of transfer from a horizontal to a vertical conveyor.

Belt conveyors: The belt conveyor is perhaps the best known type of power conveyor. Frequently, rollers are used for the intermediate sections between the end pulleys, but a more modern and usually more economical intermediate is the "slider" type. Ordinarily the bottom and side guards are formed of one piece of sheet metal. The belting slides in this trough. The slider type of intermediate is confined to comparatively light loads weighing 50 lbs. per square foot or less, because of increased friction and wear when heavy loads are conveyed.

Booster conveyors: Belts are often installed to convey loads up or down inclines. Cleats may be fastened in the belting, the maximum angle of incline being governed by the stability of the loads. Cleats present a real problem, however, in transferring loads from conveyor to conveyor. To overcome this objection, belting with



* *Sanitape-Sealtite*

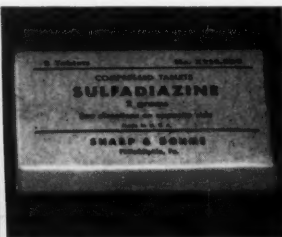
TODAY we are producing packages which are not only satisfactory from the usual point of view, but actually meet more stringent specifications than were ever prescribed in normal times. We call your particular attention to military packages shown below.

As a result of our years of specializing in the making of those unique packages produced by Sanitape-Sealtite method, we are able in these crucial times to give unusual

aid to concerns who might otherwise be faced with grave difficulties in packaging their products.

We can make many packages which do not require materials on priority lists. The range of the products which we can handle is almost limitless. The styles, sizes, and kinds of package which can be developed to meet particular requirements are so endlessly varied as to assure complete satisfaction.

3 NEW PACKAGES FOR THE ARMED FORCES



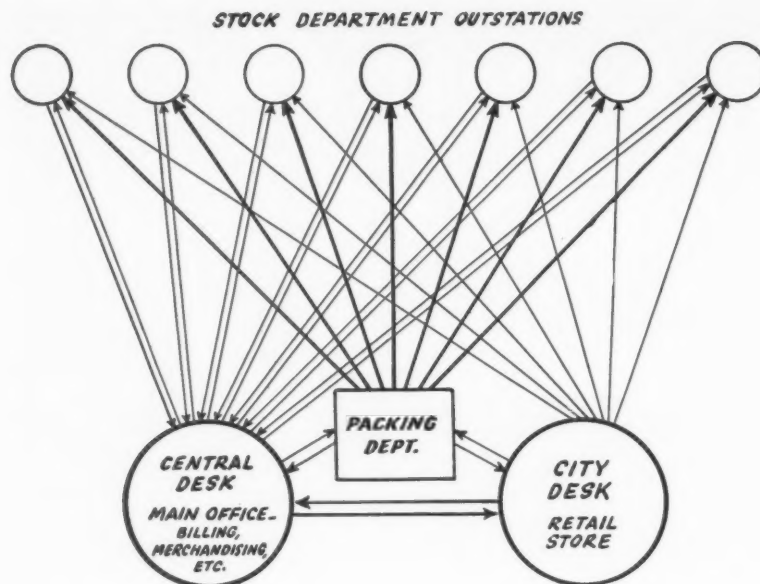
We are accustomed to meeting such unusual specifications as (a) submergence for from four to twelve hours, (b) ability to withstand unusual breakage tests, (c) the requirement that package be vermin proof as well as that it assure cleanliness and maintenance of efficacy indefinitely. Packages above for the armed forces, containing vital dosage, satisfy all these requirements.

* Sanitape-Sealtite is a unique method for packaging pills, tablets, capsules, creams and powders, by which each unit or unit dose is sealed in its own air-tight compartment—assuring protection and maintained efficacy.

IVERS · LEE COMPANY · NEWARK · N · J

PACKAGING CATALOG

453



5. A simple pneumatic tube system facilitates exchange of correspondence, orders, stock requests, shipping notices, etc. Sketch Lamson Corp.

special non-skid surfaces is used. Angles of incline are then limited by the non-skid effect of the belting on the load being conveyed.

Chain slat conveyors: This type of conveyor consists of two strands of chain with slats fastened to attachments on the links of chain. It is used in place of belt conveyors when either the weight or the character of the load would damage the belting.

Overhead chain conveyors: In this type of conveyor the chain is supported from trolleys which operate in or on overhead steel track. Means for attaching the load to the chain are provided and may be in the form of hooks or carriers. The conveyor dips when necessary to bring the load down to a working height for removal at an operation or for performance of an operation while the load is on the conveyor. In this way the floor between operations is kept clear of obstructions.

Vertical conveyors: There are several types of vertical conveyors. The reciprocating type consists of a car suspended by chain or cable over a sprocket or sheave

with a counterweight suspended at the other end. The load is usually automatically conveyed to and from the car, while the travel of the car in the shaft is controlled by limit switches.

Continuous vertical chain conveyors consist of one or two strands of chain with cars suspended from the chain. The cars are finger type that comb through corresponding finger type loading and unloading stations to effect automatic loading and unloading. This type of conveyor permits continuous loading at one level and unloading at another level at much higher rates than are possible with the reciprocating type of vertical conveyor. Vertical chain conveyors can also be made to give fully intercommunicating service to several floors. With this type of conveyor loads at any floor may be dispatched to any other floor.

Conveyor engineers have helped hundreds of manufacturers to make man-power and man-hours more productive by planned material handling, by saving valuable time, using plant space more effectively, and by releasing man-power for more productive work.

6. Reversible slat conveyor handles loads to packing and shipping departments. 7. Overhead chain conveyor in warehouse carries cartons of paint to and from storage and to loading dock. Photos Lamson Corp.



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Lubrication of Packaging Machinery

by John B. Tuttle

HIGH speed and intricacy characterize modern packaging machinery. These terms typify weighing, filling, wrapping, labeling, sealing, and cartoning units. The complicated mechanism of each performs a myriad of packaging functions at the highest possible output speed compatible with quality production. The machine elements in each unit present literally hundreds of metal to metal contacts which must be separated with a lubricant to avoid excessive wear and insure long operative life. Modern petroleum technology provides lubricants exactly suited for such applications.

In its simplest terms the lubrication of packaging machinery is the same as other high speed, complex mechanisms. The correct lubricant must be selected and properly applied at regular intervals. The second part of the problem is largely up to the machine operator, once the selection is made. While many operators are also able to make the selection, it is generally recommended that a lubrication engineer of a reputable oil company be consulted in the matter.

Choosing the correct lubricant includes consideration of all the factors which affect its performance. To the uninitiated these may seem fewer in number than is really the case. For example, in lubricating a given group of packaging machines an engineer may have to consider any or all of the following: the machine element involved—gears, bearings, cams, slides, etc.—the temperature of the moving parts, the load and load variation, the speed and speed variation, operating clearances, whether parts are open or enclosed, atmospheric conditions, importance of leakage, contaminants such as the material being packaged or glue, etc., and the method which can be used to apply the lubricant. In food handling equipment there may also be government or municipal regulations covering the quality of the lubricant used. All these factors must be weighed as to relative importance and the lubricant chosen whose proper use will most nearly satisfy all of them. Occasionally this may have to be a compromise, but the time spent will pay dividends in freedom from shut-downs and repair expense.

A lubricant usually performs two functions. It prevents contact of metal surfaces, substituting low internal friction of the lubricant itself for the high friction of the metal. It also serves as a means of dissipating frictional heat by conduction. These two functions dictate in a general way the nature of the lubricant and its physical character. High speed spindles are best lubricated with a light bodied oil; the higher the speed, the lighter the oil used. Light bodied oils have low internal friction and are good heat conductors. Also they flow freely at all temperatures, insuring a constant lubricating film on the rapidly moving parts of the machinery.

Slow moving elements may require viscous or semi-solid lubricants. Their slow speed causes less frictional heat and maintenance of a lubricating film is of greater importance. The greater density of the heavier oils enables them to cling to the element surface, preventing damaging metal contact. Also, their cohesive nature limits the amount of the lubricant which will be thrown off, reducing the frequency of application.

Petroleum lubricants for packaging machinery are of two general types—oils and greases. Oils vary in viscosity or body density from light spindle oils to heavy cylinder oils; for example, in enclosed gear drives. Greases are oils of different viscosities which have been rendered solid or semi-solid through the addition of soap or other thickening agents.

The soaps used are usually calcium, sodium, or aluminum each imparting certain special characteristics to the grease prepared with them. Calcium or lime soap greases resist water but are somewhat less stable under high speed operating conditions than soda soap greases. For this reason calcium soap greases are usually chosen for bottle filling or canning machinery where water inevitably reaches the bearing surfaces. Likewise soda soap greases are usually recommended for high speed anti-friction bearings or bearings subjected to high operating temperatures caused by radiant heat.

Aluminum soap greases have less water resistance than calcium base products but possess high cohesive power. They are usually applied to parts subjected to intermittent or throwing motion where they must adhere firmly to the metal surface. All these grease types are available in different consistencies and correct selection involves considering both the composition and the physical form of the lubricant.

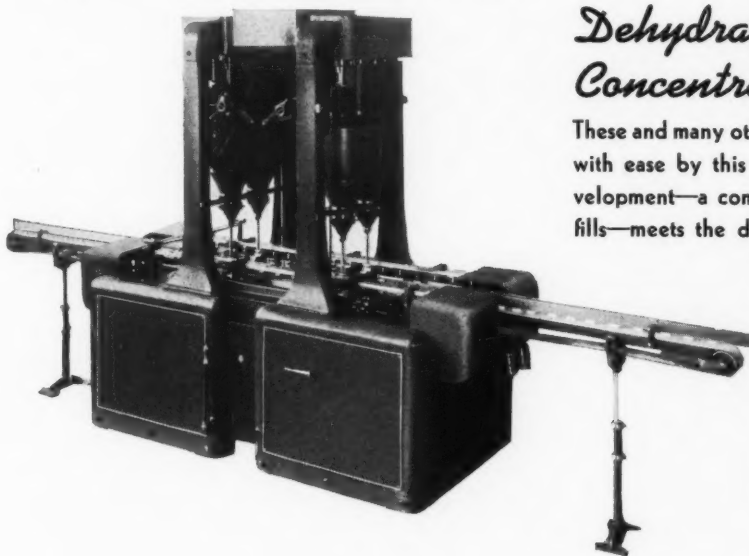
Most packaging machine bearings are of two types—anti-friction or plain journal bearings. The anti-friction bearings are of the ball or roller type and most frequently are grease lubricated. They usually operate at fairly high speed and should require lubrication at infrequent intervals if the grease has been correctly chosen and is not washed from the bearing by water or other contaminants. Most anti-friction bearing manufacturers prefer the soda type lubricant since it exhibits better stability in service. However, soda base greases cannot be used in moist or wet conditions and calcium or aluminum greases must be applied. Examples of such conditions are canneries and dairies.

The grease is usually applied to the bearing with a grease gun of appropriate size which is filled directly from the shipping container of grease. Caution in using the gun should avoid excessive use of grease. Many precision bearings may be harmed as much by excess grease

Packaging Machinery modern equipment for modern uses

MODEL JN AUTOMATIC PACKER

Speed — up to 120 packages per minute



Dehydrated Egg Powder Concentrated Powdered Foods

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The four-station model shown, as well as our other smaller automatic and semi-automatic fillers, are working full time packaging vital food products required for consumption at home and by our allies abroad.

OUR *Brightwood Box Machines*—

(in both the STANDARD and UNIVERSAL models)

are also busy on defense production. Thousands of cartridge cartons, Army shoe boxes and boxes for many other Government and civilian needs are being turned out daily on these machines. Their versatility, their sturdiness, their ability to give fine performance on day-in day-out production, year after year, have deservedly earned for the Brightwood Machines their high reputation in the box making field.

We build a complete line of packaging machinery for a wide variety of different products and containers. We'll be glad to submit information and suggestions if you'll let us know your packaging requirements.

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Branch Offices: New York, Cleveland, Chicago

as by too little. If the grease is packed into the bearing under pressure the friction between the rotating element and the grease may cause overheating and seizure. Many bearings are designed with vents to prevent this, but if they are not evident care should be taken to avoid over-lubrication.

Many plain bearings on packaging machines are also lubricated with grease. These include journal bearings which are not easily accessible, bearings which require infrequent lubrication due to slow speed or low load, and elements such as cams, slides, etc., on which a film of oil cannot be maintained easily. The grease is usually applied either by a grease gun or through a screw-down cup. Gun application usually involves applying enough grease to force some out of the ends of the bearing. This tends to flush out any contaminating abrasive present and insures a complete grease film within the bearing. Screw-down cups are filled at regular intervals by removing the cap and filling the recess level full with grease. Bearing lubrication is accomplished by turning the cup down a few turns at each lubricating interval until the grease has been used. Spring loaded cups are available if the grease must be applied by constant pressure.

Oils are usually applied by hand can, drip oiler, wick, or mechanical feed system. The drip oiler has a reservoir which feeds oil slowly by gravity while the bearing operates. Wick feed depends on the capillary climb of the oil to replace that wiped from the wick surface in contact with the moving element. Mechanical systems are synchronized with the machine motion and deliver a measured amount of oil at regular intervals. Satisfactory operation of any of these requires systematic examination to determine their condition and, of course, the selection of both oiler and lubricant fitted for a given machine element.

Spattering and dripping of the lubricant is a disadvantage on almost all packaging units. The oil may reach the contents of the package, spoiling it; it may damage the appearance of the container and cause excessive

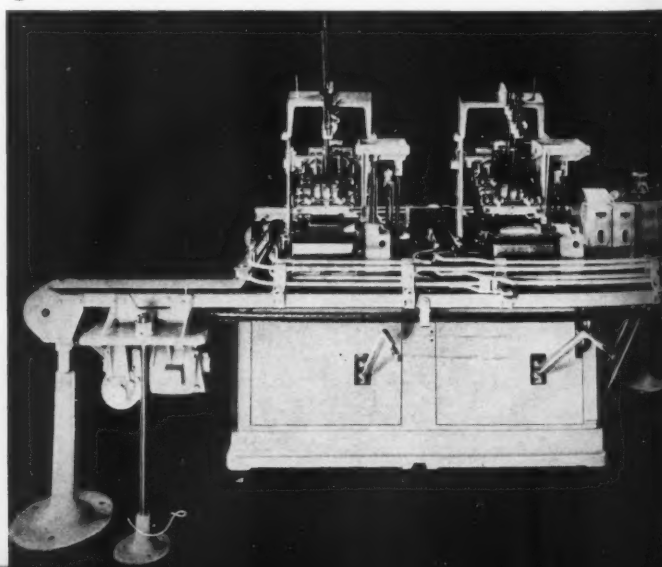
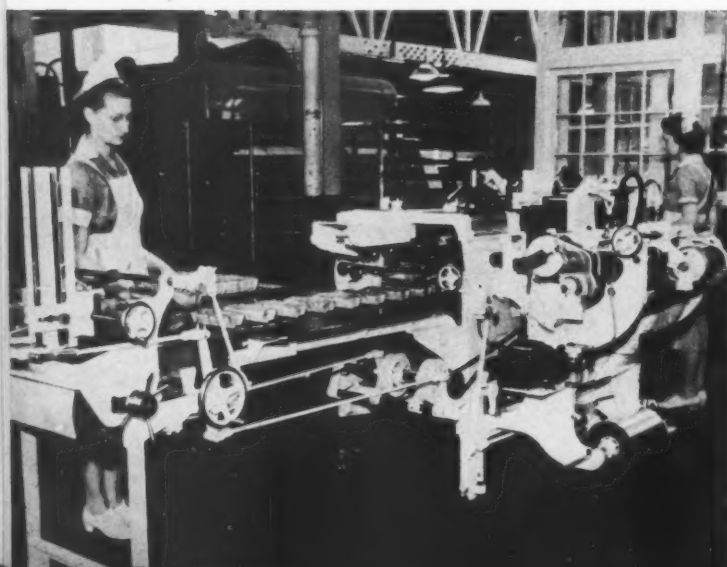
lubricant expense. Aware of this, the petroleum technologist has developed the so-called semi-fluid or clinging type oil lubricant. These products are semi-fluid in consistency and contain additives to improve both their cohesive and adhesive properties. These are of special interest for use on cams and other intermittent motion units which tend to fling the lubricant from their surfaces. They are usually light in color and solve many difficult lubricating problems.

In packaging foodstuffs and such items as cigars, cigarettes, and pharmaceuticals, it is usually desirable to use a lubricant which is not deleterious to human health should it inadvertently reach the packaged material. The petroleum industry meets this need with both oils and grease-like materials—petrolatums which are U. S. P. in quality. These are entirely satisfactory as lubricants and their refinement permits internal use without ill effect.

Having selected the proper lubricant and arranged its systematic correct application, there remains the problem of storage. The petroleum manufacturer realizes that modern high speed units are frequently machined with a precision formerly accorded only to fine measuring instruments. Maintenance of these surfaces is vital to their operation and they may be easily spoiled by only slight contamination of the lubricant. He therefore cleans shipping containers with care and repeatedly filters each lubricant as it is packed. All this is valueless in terms of machine protection if the machine operator does not observe equal care in storing and using the material.

Barrels and cans should be stored so they are easily accessible but as free as possible from atmospheric contamination. Each should be clearly marked and preferably always stored in the same place. Habit is a good guard against misapplication only if the lubricant is always in the same location. Barrels should be fitted to suit filling the type of small container used which should have some regular storage space. System in lubrication is difficult only until one gets used to it.

1. On automatic wrapping machinery which handles food products, special non-injurious lubricants must be used to avoid any possible hurt to the consumer. Photo Battle Creek Bread Wrapping Machine Co. 2. A modern labeling machine is one of the packaging mechanisms which requires careful lubrication to eliminate frictional drag and wear, and to dissipate heat which is caused by high-speed operation of the machinery. Photo Economic Machinery Co.



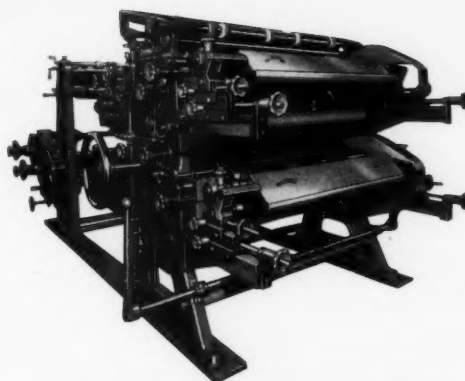
"IN THESE CRITICAL TIMES"

**...WE'RE GLAD WE
BOUGHT HUDSON-SHARP
PRINTING PRESSES**



Uninterrupted production is all important these days . . . on the home front as well as the war front, and throughout the country you'll find Hudson-Sharp printing presses meeting the most rigid requirements with record breaking efficiency. Small wonder then that owners of this equipment proudly boast of their wise policy in buying Hudson-Sharp quality when they did. . . . They now have the tangible evidence of dependable performance and low cost maintenance as their just reward.

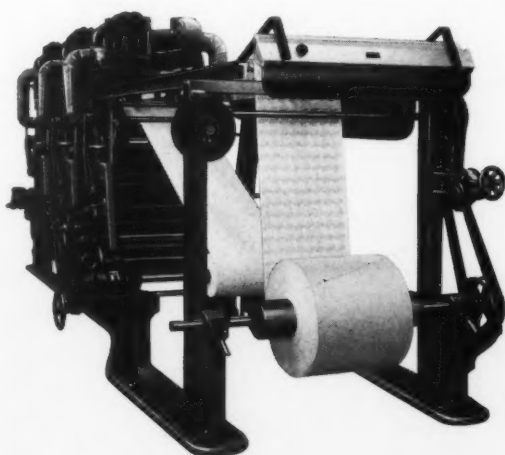
Presses aren't easy to replace these days and of course we couldn't supply one unless you had the proper priority. Fortunately however, there has been no curtailment on engineering brains and ingenuity. . . . As a result, we will again be ready to serve you with even newer and better equipment as soon as victory is won. In the meantime our men and machines are building for our country.



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Package Printing Equipment

by William Barton Marsh

PACKAGE wraps and containers and labels have been and are being today imprinted and decorated on every conceivable type of equipment from the simple, hand-fed job press to the intricate, web-fed, multi-color offset or gravure press. In short, the selection of equipment and method of reproduction to be used must depend upon the character of the job to be done. One can no more say that any one type of printing equipment is the best for package work than one can say that any one type of knife is the best for cutting.

Here are some of the basic factors which must be considered before a decision can be reached as to the type of printing equipment which will be most suitable for any given packaging job:

1. What material is to be printed or decorated?

It makes a great difference whether reproduction is to be done on paper, cardboard, cellophane, metal, or some other of the innumerable substances used in the construction and wrapping of containers. No one printing unit has ever been constructed that will reproduce on all of these different surfaces with equal success.

2. What is the quantity to be produced?

Length of run of any given label, wrap, or container is highly important in selection of equipment. It is impractical to attempt to produce package wraps or containers in production units of a few hundreds or thousands on the same type of equipment that is used, for example, to turn out chewing gum wrappers for which production units run into the millions.

3. What quality of work is required?

The amount the manufacturer can afford to pay for his container may be any figure from a fraction of a cent to one preceded by a dollar mark. His choice of wrap or container, of elaborateness of design, of number of colors to be used in decoration, will depend upon this factor of cost as well as on the kind of merchandise he sells, the market he hopes to reach, the competition he has to face, and so forth. Certainly the packaging of a 5-cent bar of soap will

differ in many respects from the packaging of some exotic perfume which sells at \$50 an ounce. The printing equipment most suited to the job must be gauged partly by the quality of the work to be done.

4. What are the characteristics of the container?

If it must be water-proof, dust-proof, scuff-proof on dealers' shelves, resistant to acid, heat, or cold—all these factors have a bearing on the type of basic material from which the container is made and consequently upon the type of surface to be decorated. They also have a profound influence upon the kinds of printing inks, over-print varnishes, etc., that may be used and the methods of applying them. Obviously this directly affects any decision as to printing equipment.

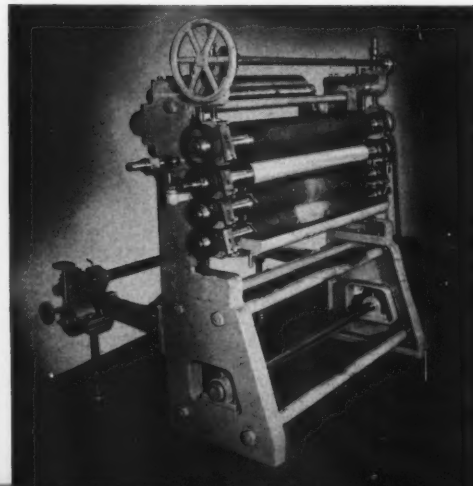
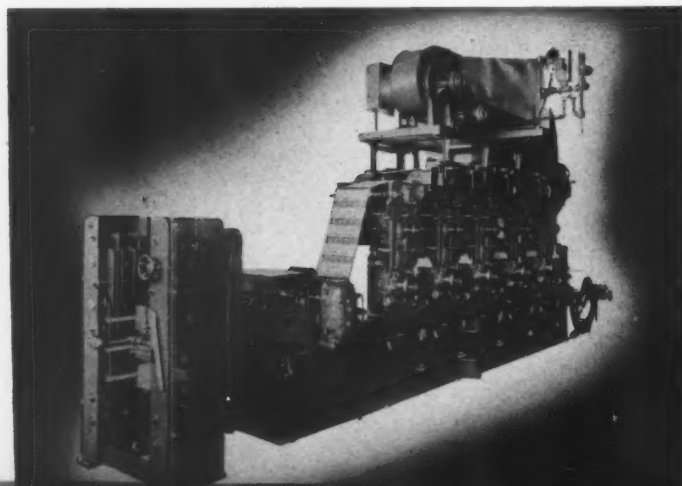
Since it is impossible to describe here all the different types of printing equipment that may be used for packaging, discussion will be limited to the major printing processes now in common use and to a few typical examples of the equipment commonly used in each of them.

The three major printing processes

There are only three major printing processes in common use today: (1) Letterpress or relief printing; (2) lithography or planographic printing; and (3) gravure or intaglio printing. The many variations listed under each of these main headings are mostly in superficial technique rather than the basic processes. Collotype reproduction, for example, differs considerably in technique from lithography, but both are basically planographic processes. All three of these major processes are regularly used in the imprinting and decoration of containers. A correct solution of package decorating problems, therefore, requires some understanding of all of these processes and of the outstanding characteristics of each.

1. Letterpress or relief printing: The fundamental process of reproduction in graphic arts both because it was the first to be developed and because it is still the process most commonly used. In letterpress printing the image

1. Five-color rotogravure press which delivers up to 54,000 wrappers or labels an hour. Photo Champlain Corp.
2. Versatile machine for rubber roller printing, rotogravure printing, aniline coloring, pigmented coloring, gold and silver coating and relief topping of embossed stock. Photo A. E. Marconetti, Inc.



HORIX MANUFACTURING CO.

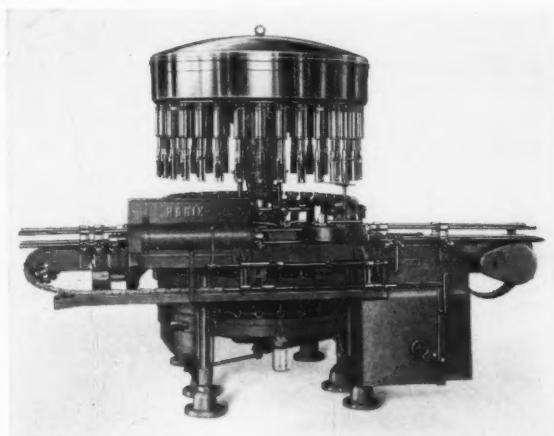
PITTSBURGH (4), PA.

Manufacturers of HORIX, HALLER, and BERGMANN Filling and Conveying Equipment

PRODUCTS HANDLED

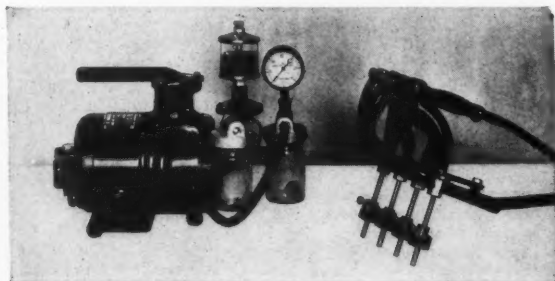
Sauces	Catsup	Medicines	Vegetable Juices
Oil	Vinegar	Extracts	Polishing Wax
Cosmetics	Molasses	Turpentine	Tomato Pulp
Beverages	Syrup	Insecticides	Ice Cream
Water	Brine	Fruit Juices	Cottage Cheese

AUTOMATIC ROTARY FILLERS



Suitable for plants requiring maximum continuous speed with minimum labor. Feed, filling and discharge are completely automatic. Automatic safeties prevent damage and lost time due to defective containers. Fillers available in 7, 9, 12, 14, 18, 21, 24, 28, and 32-valve sizes. Will fill all types of containers, at speeds up to 400 a minute. Operate with all standard washers or closing machines. Quickly adjusted to different sizes of containers. Fill uniformly, without drip or waste. Easily dis-assembled for cleaning or adjusting. Sturdily constructed to insure dependability and long life. Safety devices automatically stop the machine in case of jams at infeed or discharge, and prevent damage to filling machine and costly production delays due to choke-neck bottles. Can be built in vacuum, gravity, or combination gravity-vacuum type, depending on product filled.

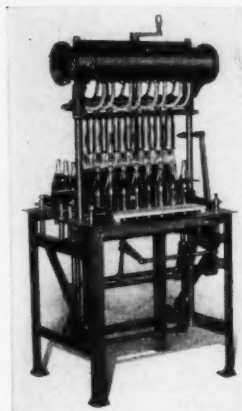
PORTABLE VACUUM FILLERS



A simple, easily-operated machine of wide adaptability. Consists of compact motor-pump unit, with built-in switch; light-weight filling head, with quickly adjustable valves; over-flow jar; necessary hose connections. Motor can be connected to light socket. Filling head balanced to minimize fatigue. Easily cleaned. Capable of filling 14 pints or 18 half-pints a minute.

STRAIGHT-LINE FILLERS

Ideal for filling small lots of different products into a variety of containers. Handle any shape or size of bottle from 4 oz. to 1 gallon. Change from one size container to another is quickly and easily made. Fill 4 to 12 bottles at a time, depending on their size. Filled bottles can be discharged onto a moving conveyor. Do not require expert mechanics. All parts accessible for cleaning. Capable of filling 50 pts. a min. Can be built in vacuum, gravity, or combination gravity-vacuum type, depending on product filled.

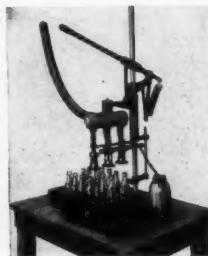


PLUNGER-TYPE FILLERS

Hand-operated Plunger Fillers accurately and quickly measure Ice Cream, Cottage Cheese and Sour Cream into containers. Simple, no complicated parts to get out of order, easy to clean. Double-action design gives greater production with less labor. Change from various size containers easily made. Will fill any standard cup or carton. Capable of filling 15 pint cartons of ice cream a minute.

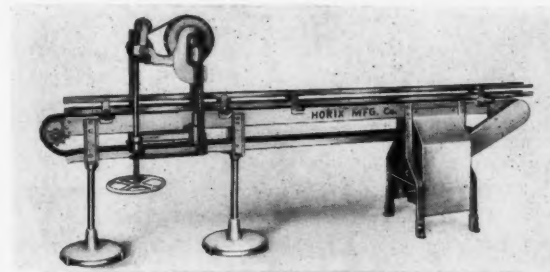
BENCH-TYPE FILLERS

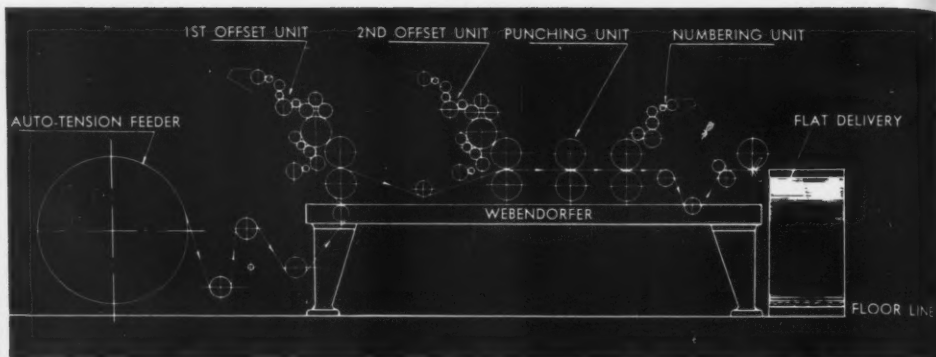
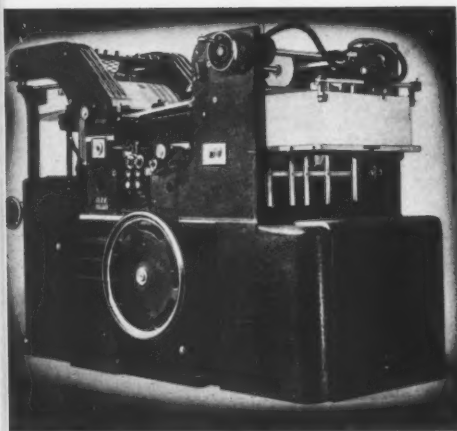
Simple, efficient machines that will quickly save their moderate cost by doing away with loss of product. By use of special feed trays, various size containers can be handled, at speeds of 10 to 20 a minute, depending on product and size of container. Fill cans and jugs, as well as bottles, from miniatures to 5³/₄ in. diameter containers.



CONVEYING EQUIPMENT

Chain Conveyors, which speed up production and save labor, can be furnished with any desired length, with or without work-boards on sides. Constant or variable-speed drive units.





3. Typical sheet-fed letterpress equipment. Letterpress, the first developed, still is most commonly used printing process. Photo American Type Founders, Inc. 4. Profile drawing of two-color, web-fed high speed offset press. Diagram Webendorfer Division of American Type Founders, Inc.

is reproduced by the application of ink to a raised or relief surface. The first medium used for relief printing was probably the wood cut, which was employed to reproduce pictures even before Gutenberg. Today letterpress printing utilizes type or plates or any character cast or engraved in relief on metal, wood, rubber, linoleum, plastic material, or any other substance that will receive and hold the outline of the picture or character to be printed.

Letterpress printing has great flexibility, is particularly notable for its sharpness of outline and its ability to reproduce strong, clear color.

2. Lithography or planographic printing:

Called *planographic* printing because in this process the image to be reproduced is on a plane surface, not raised as in letterpress. The process is made possible by the natural, mutually repellent properties of oil and water. In the original process (now known as *direct lithography*) the image is drawn with a greasy medium on a piece of semi-porous stone which is then moistened with water. When ink is subsequently applied to the surface of the stone, it is repelled by the water and adheres only to the greasy outline of the image. This is reproduced by applying paper under pressure directly to the surface of the stone.

Today direct lithography has been to a very large degree superseded by *offset lithography*. The basic principle of the process is the same, but in offset the image to be reproduced is etched by means of light upon a thin metal sheet which has been previously sensitized by a coating of bichromate albumin. After proper treatment, the albumin is washed away except where the image rests. Thus the image itself will accept the ink, whereas the raw metal when dampened with water will repel it. The image is not reproduced by the direct application of the paper to the inked image. The ink is first transferred or "offset" on a rubber blanket from which it is in turn transferred to the paper.

Offset lithography is particularly notable for a softness of tonal values difficult to achieve with letterpress. Offset is likewise most valuable for reproduction upon surfaces (such as coarse-grained papers, cardboard, etc.) which are not suitable for the precise reproduction made by letterpress.

3. Gravure or intaglio printing: The direct opposite of letterpress. The image to be reproduced is cut into a thin sheet or cylinder of copper. The ink, which is applied as a very thin liquid, fills up the small interstices of the image—excess ink being removed by means of a "doctor" blade. The image is transferred to the paper by direct pressure, the paper sucking the ink from the recessed dots that form the image. Gradations of tone are obtained by varying the depth of the engraving; areas that are to reproduce the darker images are more deeply cut into the metal and carry more ink. Thus by means of gravure printing it is possible to achieve a full range of values from full velvety tones to fine highlights.

Typical printing equipment

Some idea of the variety of printing equipment now being manufactured, may be obtained by referring to the *Printing Year Book and Almanac*. This reference book divides manufacturers of printing presses into nine different groups listed below. Obviously there is considerable duplication in this listing, many of the manufacturers being listed under several categories. It is also clear that there are many printing presses constructed for particular purposes which have little or no relation to packaging. The list of possible equipment which may be used for packaging is so long that only a few typical examples of the printing equipment more commonly used can be given here. These examples are:

Type of Press Manufactured	Number Manufacturers
For aniline and other fluid inks	13
For production of continuous forms: fanfold, multiple billing, sales books, and snap-out	13
Hand-fed and automatic cylinder, die-cutting and creasing, embossing, and perfecting small hand presses	32
Sheet-fed, rotary gravure	24
Sheet- and web-fed offset, offset perfecting, metal decorating, combination offset and letterpress	17
Proof presses	11
Sheet- and web-fed offset, rotary presses: flat-bed web and others	24
For stamping, die-stamping, and roll leaf hot stamping	14
For specialties: cartons, milk-bottle caps, tags, tubes, and wrappers	51

CHAMPLAIN PRESSES

for Faster, Finer Package
and Label Printing



Champlain Model F-16 five color gravure press with sheet and delivery, capable of printing five colors or four colors with overprint gloss, cutting to size and delivering labels at the rate of 54,000 per hour.

CHAMPLAIN rotogravure presses offer printers many advantages which make possible faster production at reduced cost. The simplicity of the gravure principle eliminates make-ready and permits rapid changeovers and high flexibility in printing.

All Champlain presses are equipped with the patented Speed-dry enclosed ink fountain. With this device, the ink remains uniform; highly volatile solvents may be used without fear of evaporation in the fountain.

No splashing is possible, and the fountain protects the ink from foreign particles. Fast drying gravure inks provide press speeds that make for extremely economical operation.

No longer associated only with newspaper supplement and magazine printing, rotogravure is now widely used in the package printing field. Here is a partial

list of items now being successfully printed by this modern method:

BEER LABELS, BOTTLE LABELS, CAN LABELS, CANDY WRAPPERS, CHEESE WRAPPERS, CIGAR WRAPPERS, CIGARETTE WRAPPERS, COFFEE BAGS, DESSERT CARTONS, FOLDING BOXES, GUM CARTONS, GUM WRAPPERS, MATCH BOXES AND FOLDERS, PHARMACEUTIC PACKAGES, RAZOR BLADE WRAPPERS, SOAP WRAPPERS, SUGAR TABLET WRAPPERS, TEA TAGS, THREAD LABELS, WAX PAPER CARTONS, WINDOWBOXES.

FREE BOOKLET. If you would like to know more about how to print containers economically and attractively by rotogravure, write to Champlain Division of Interchemical Corp., 636 11th Avenue, New York City. A booklet, "Advantages of Gravure for Package Printing," will be sent to you, free.

CHAMPLAIN DIVISION OF INTERCHEMICAL CORP.

636 ELEVENTH AVENUE • NEW YORK CITY, N. Y.

PACKAGING CATALOG

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Letterpress equipment

Most letterpress equipment, except that used for newspaper and magazine work, is sheet-fed. A great number of different types of presses come within this category, but for commercial job printing the three most important types in common use are:

- 1) Hand-fed and automatic platen presses (Brandjen & Kluge, Inc., The Chandler and Price Co.);
- 2) Hand-fed and automatic cylinder presses (American Type Founders, Inc.; Miehle Printing Press and Manufacturing Co.; Miller Printing Machinery Co.);
- 3) Sheet-fed rotary presses (C. B. Cottrell and Sons Co., Goss Printing Press Co., Harris-Seybold-Potter Co.).

Important for packages and labels are the multi-color letterpress units (Champlain Corp., the C. B. Cottrell and Sons Co.; the New Era Manufacturing Co.; Webendorfer Division of American Type Founders, Inc.) which will reproduce two or more colors in one printing operation. Many of these multi-color units are fed from a roll rather than by sheet.

Offset equipment

A number of different companies manufacture sheet-fed offset presses and these in several sizes. A recent comparative chart in the magazine, *Modern Lithography*, lists 35 different models currently being manufactured. Among those in common use for commercial work are the presses built by the Harris-Seybold-Potter Co., R. Hoe and Company, the Rutherford Machinery Co., and Webendorfer Division of American Type Founders, Inc.

Sheet-fed offset presses are also manufactured for the highest type of multi-color offset work. Standard

models are available that will reproduce in as many as four colors in one operation.

Web-fed offset presses which operate at a very high production speed are now being used with increasing frequency for both single and multi-color offset work. Much of this equipment is built specially by the manufacturer to meet customer specifications. Among those specializing in this type of equipment are R. Hoe and Company, the New Era Manufacturing Co., and the Webendorfer Division of American Type Founders, Inc., among others.

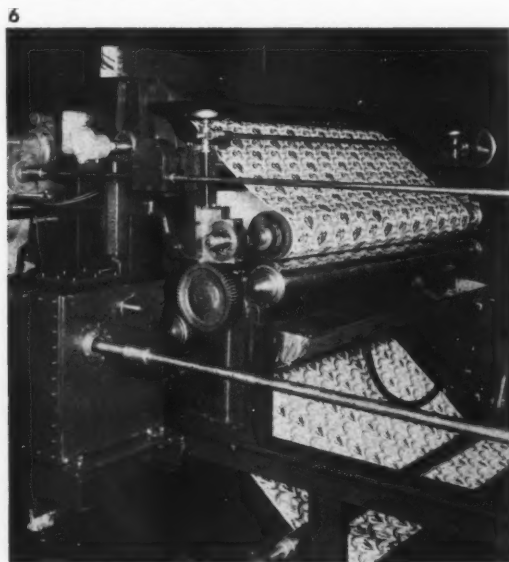
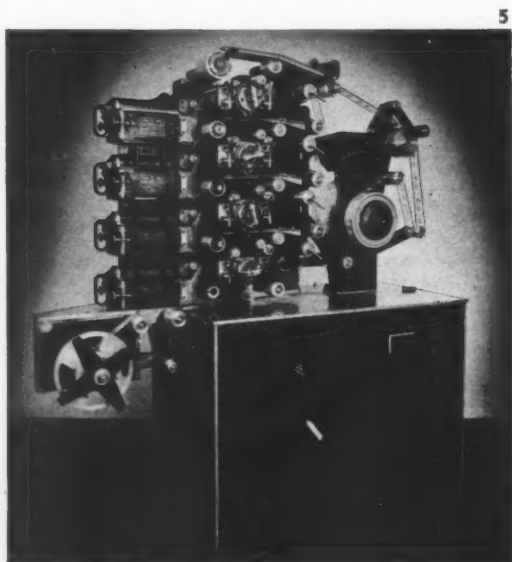
Decoration on metal for containers is done almost entirely by the offset process. Special offset presses are required for this work because of the character of the material to be handled and of the process itself. Both single- and two-color metal offset presses are available, the more modern being equipped with automatic feeding devices. Manufacturers specializing in this type of equipment include the Apex Products Corp., the Bathrick and Palmer Machine Co., R. Hoe and Company, and the Rutherford Machinery Co.

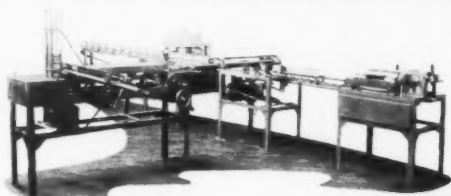
Gravure equipment

An important development for packaging is the sheet-fed gravure press. These small gravure units are just coming into their own and may be expected to take an increasingly active part in the production of commercial printing. Manufacturers of this type of equipment include the General Printing Machinery Co., the Harris-Seybold-Potter Co., the Hudson Sharp Machine Co., and the Rotogravure Engineering Co.

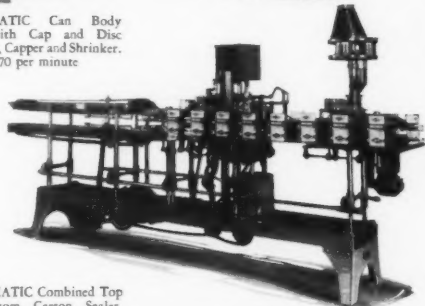
Web-fed gravure equipment is most commonly associated with the production of newspaper rotogravure supplements and picture magazines. However, gravure is finding steadily increasing opportunities in the pack-

5. Four-color cabinet model press prints and rewinds cellophane at the rate of 150 ft. a minute. Photo Champlain Corp. 6. Multi-color gravure printing press. Web runs from 10 in. to 60 in. in width. Available in one to four colors. Photo Gravure Labs., Inc.

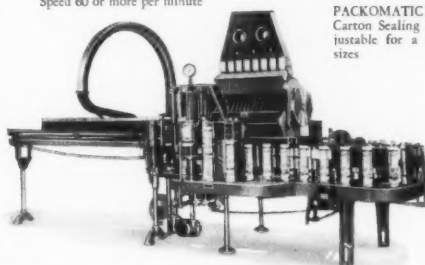




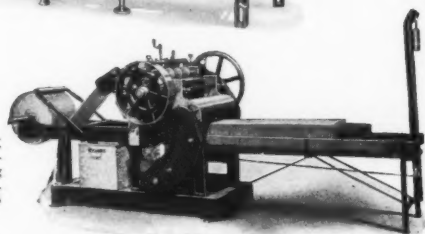
PACKOMATIC Can Body Gluer, with Cap and Disc Assembler, Capper and Shrinker. Speeds to 70 per minute



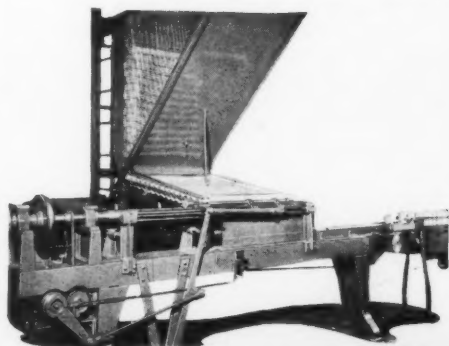
PACKOMATIC Combined Top and Bottom Carton Sealer. Speed 60 or more per minute



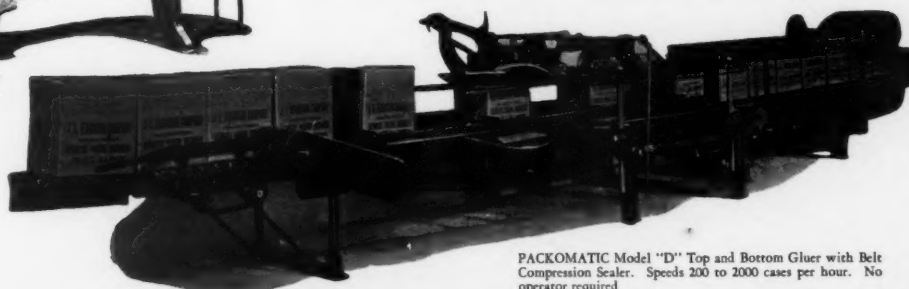
PACKOMATIC Pocket Type Carton Sealing Machine. Adjustable for a wide range of sizes



PACKOMATIC Automatic Carton Making Machine. Speeds to 175 per minute



PACKOMATIC Automatic Paper Tube Cutter. Speed 10 to 20 tubes per minute



PACKOMATIC Model "D" Top and Bottom Gluer with Belt Compression Sealer. Speeds 200 to 2000 cases per hour. No operator required

PACKOMATIC

Engineers Meet the Changing Demands of War!

You may be changing your type of packages from valuable metal to paper, or from square to round types, or changing package sizes. Whatever your problem we invite you to take advantage of our many years of packaging and production engineering experience.

Economical high speed packaging of foods and other products, is more essential today than ever before. The saving of man hours, and increasing production automatically, is a war necessity.

Realizing our first obligation is to furnish equipment and machines for direct war manufacturing activity, we have devoted our energy to that end, and now 100% of our production is directly for the war effort.

You are also probably devoting your production to the war effort. If so, priorities are available for the necessary equipment you need, and we are glad to have your inquiries.

We've got a big job ahead of us, and we can do it by stepping up production, and by buying more War Bonds.

PACKOMATIC

PACKAGING MACHINERY

J. L. FERGUSON COMPANY, JOLIET, ILLINOIS

REPRESENTED IN ALL PRINCIPAL CITIES

aging field because of the ability of these presses to use highly volatile inks and to apply lacquers and waxes. Many rotary gravure presses, such as those developed by the Champlain Corp., the Meisel Press Manufacturing Co., the C. B. Cottrell and Sons Co., and the John Waldron Co., have been specially built to meet the needs of the packaging industry.

Trends in package production

One of the outstanding trends in the imprinting and decoration of packages and in the production of package wraps and labels is undoubtedly that of steadily increasing speed of production. The number of products that are being distributed in large volume and over wide areas is constantly growing, and with this there is a corresponding growth in the size of production orders for containers and labels. To turn this work out quickly, and economically, straight-line production has become not only desirable, but also often essential.

Another outstanding trend in packaging is the increasing use of multi-color designs. Competition of containers for public attention on dealers' shelves, as well as the desire of manufacturers for individual identification of their merchandise, has done much to stimulate the demand for more and better color.

For both these reasons, there is a strong tendency for the big packaging jobs to be handled more and more on web-fed printing equipment, whether letterpress, offset, or gravure. The fundamental advantage of web equipment is that with the web of paper or other material under continuous control from feed to delivery, the material can be put through not merely one, but a whole series of manufacturing steps in one operation. Package wraps, for example, can be printed in 2, 3 or 4 colors, numbered, perforated, varnished—even specially imprinted with the distributor's name—then cut to size, and fed directly into the package wrapping equipment

without interrupting the steady flow of production. Obviously, much faster and more economical production is possible under these conditions than if each of these operations had to be done separately by a different machine. A web-fed machine combines operations.

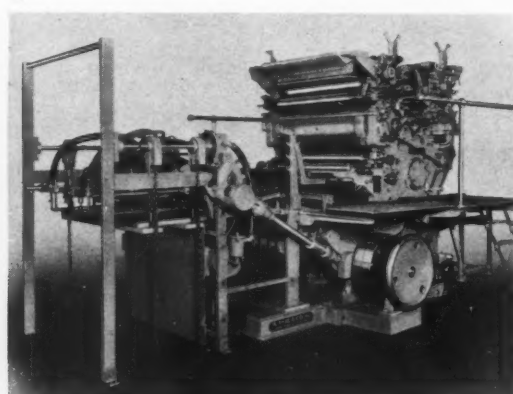
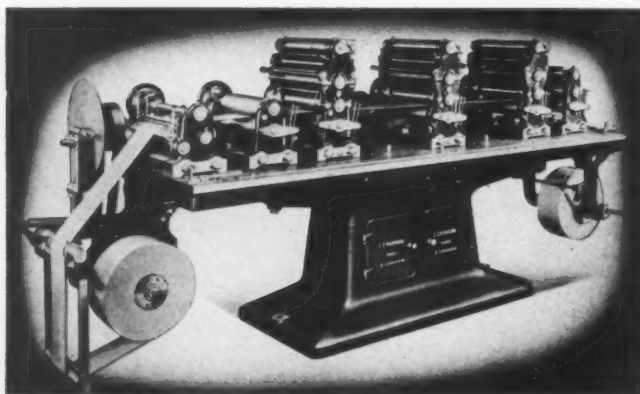
Since lithography and gravure adapt themselves more readily to a continuous web-fed operation than does letterpress, these processes are finding increasing use in the packaging field, particularly for long runs. Offset lithography has increased its usefulness by the development of the deep-etched offset plate which not only permits longer runs to be made from the same set of plates, but also improves the quality of the work done. Gravure printing has gained much favor because of its ability to deal easily with some of the recently developed fast-drying inks and lacquers.

Several of the many interesting phases of package decoration, such as the printing of cellophane and other plastics, the decoration of metal foil, the use of heat embossing and other such devices for the improvement of the appearance of the package or container, are discussed in other sections of this Catalog. It must be emphasized here that problems in packaging need careful study and analysis before final decisions are made.

Today many manufacturers who deal in volume production are finding it advantageous to set up their own printing departments to imprint or decorate their containers. In such cases, the equipment used is usually built especially to do a particular job. When a manufacturer is contemplating the setting up of his own production unit, he would do well to consult with a number of equipment manufacturers before deciding upon the equipment to be installed.

Any manufacturer who wishes to have his packages done for him by an independent printer can consult the employing printers' organization in his locality for the names of printers qualified to handle his work on the basis most satisfactory to him.

7. Typical web-fed multi-color letterpress equipment. This press operates with continuous motion, the paper traveling in a straight line, and is re-rolled at the end. Photo L. Chambon Corp. 8. Two-color rotary offset press for metal and tin can decoration equipment, with automatic feeding device. Photo R. Hoe & Co.



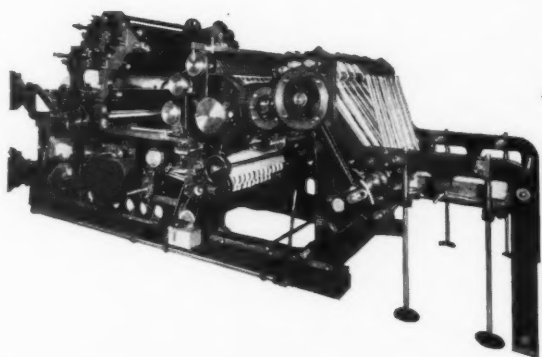
MEISEL

**PRESSES
SLITTERS
SHEET CUTTERS**



Reg. U.S. Patent Office

**MACHINES FOR
LAMINATING
LABEL DIEING**

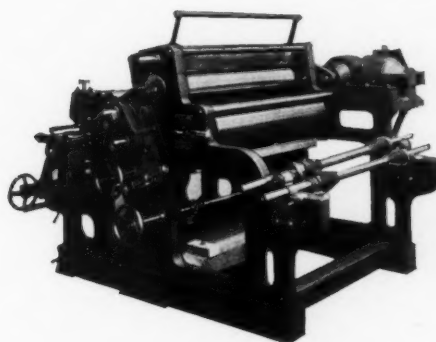


PRESSES

We build both rotary and bed and platen printing presses. These presses print from typographical plates both metal and rubber as also by offset and rotogravure systems. The multioperation rotary presses are built as fixed size, adjustable, all-size, and variable. These are patented. Several operations can be performed in one passage through the press.

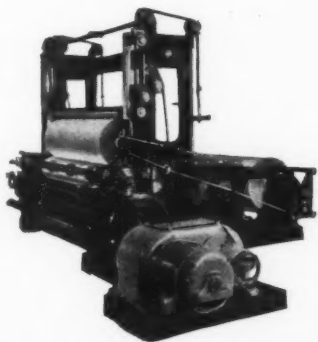
LAMINATING MACHINES

The laminating machines we build vary in size and weight to suit the materials to be combined. Hot asphalt as well as liquid adhesives and latex are used.



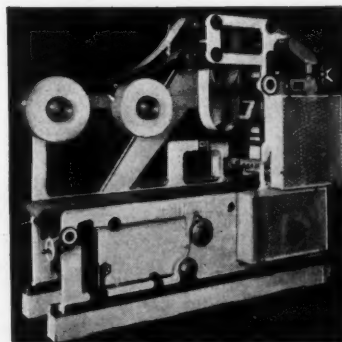
SLITTERS

Our models of slitters range from small to large and use the type of cut suitable for the material to be converted. Unwinds, rewinds, and drives vary to suit the models.



SHEET CUTTERS AND LABEL DIEING

The cutting of paper into sheets or into variformed outlines is done by an assorted group of machinery. Some do the cutting in connection with other operations. Maximum accuracy is maintained.



MEISEL PRESS MFG. CO.

944 DORCESTER AVE.

BOSTON, MASS.

PACKAGING CATALOG

467

Coating, Laminating, and Embossing Equipment

by F. W. Egan

IN addition to the printing of paper or board, there are three methods of converting them—coating, laminating, and embossing—available to the manufacturer who wishes either to enhance the appearance or to increase the protective qualities of labels, wraps, inserts, covers, containers, and boxes.

Coating

Paper may be coated for either protection or decoration. Decorative coating is used on paper that is to be imprinted or that depends upon a high gloss to give it a special finish. The protective type of coating means a finish that protects the surface of the paper or protects the contents of a package where it is used as a wrapper.

There are various types of coating machines, such as brush, roll, knife, and spray. The choice of machine to use will be determined by the type of coating. Coatings that might show brush marks can be applied better by a roll knife coater. Those with a tendency to rib, i.e., coatings with a high surface tension, can be handled by a roll coater. A spraying machine can be used to advantage on rough surfaces, but it has a tendency to dry the coating material during the spraying operation.

The best printed effects are obtainable on clay coating because mineral substances present a fine surface for printing inks. Clay coating may be applied to paper with a brush and then brushed out. As this method is limited in speed, other means of applying clay coatings

are used. Both direct and offset printing, air brush, and spraying can be used on this surface.

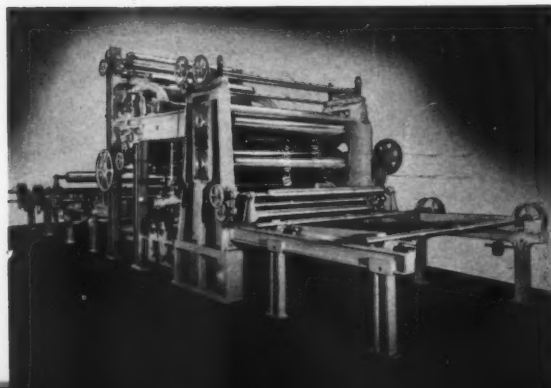
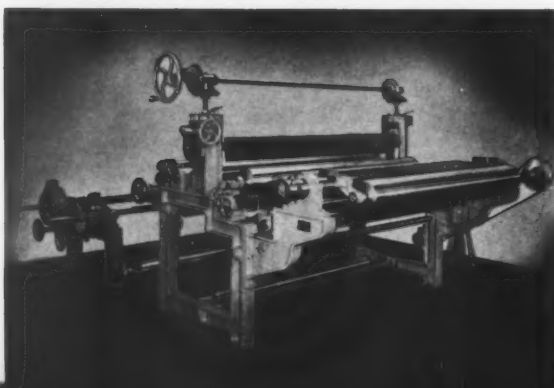
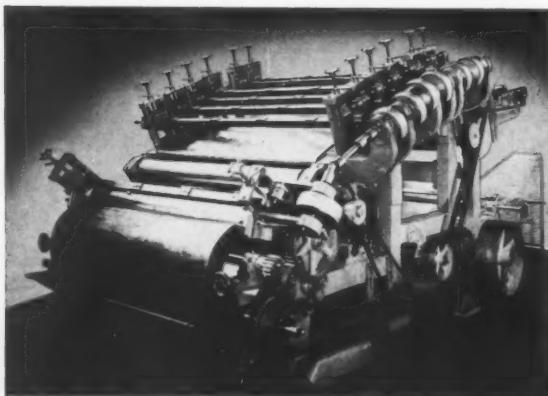
For the protection of food, coatings of lacquer and rubber derivatives are used and are most popular where packages are to be heat-sealed. The rapid advance made in the manufacture of these coatings has necessitated improvements in coating equipment. Varnishes are also used to coat papers for the protection of foodstuffs. They are applied by either the reverse-roll type of coating machine or a knife coater. The reverse-roll machine will successfully handle coatings with a solid content up to 50 per cent; whereas a knife coater can handle a solid content of 70 to 75 per cent. This latter type of unit has equipment specially ground for the application of different fine coatings.

Laminating

Laminating was formerly done on a paper machine, and the product was known as *mill-lined*. The combined web was passed around steam dryers and the best effects now obtainable from the laminating operation were frequently lost. It is now possible to combine without dryers, which permits flexing the board and lessening the rigidity that is often required in a combined web. When paper is laminated to paper or to board, the combined web should go directly from the laminator to the cutter in order to reduce mechanical curl to a minimum. If the combined web passes around any dryers, or is rolled, the sheets cut from this roll or web will always have some mechanical curl.

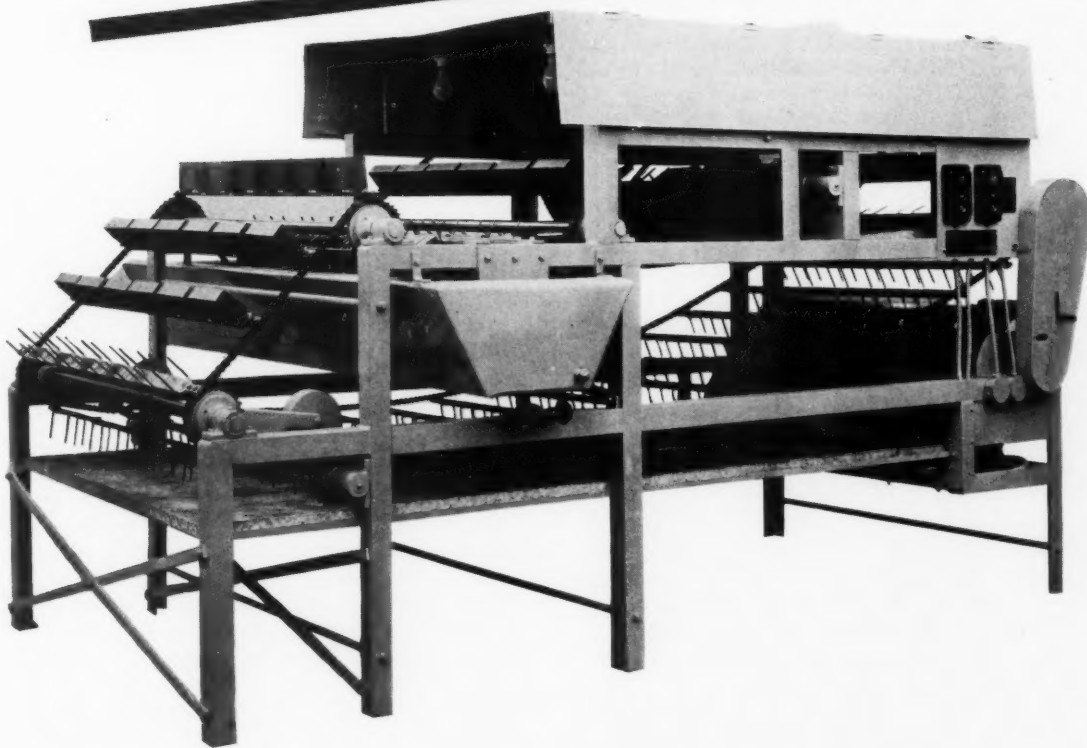
To reduce wet curl, adhesives high in solids are used, in straight-face, ground, large-diameter paste rollers which will apply a skin of adhesive having a high tack. The bond may thus be made in a single nip, and hold because no further pressure is applied. When additional nips are necessary, the large-diameter rollers in the laminator produce a semi-calendering effect.

1. Seven-brush arch bed coating machine for clay coatings. 2. High-speed laminating machine for laminating three, four or five plies at a speed of 600 ft. per minute. 3. Specially designed knife coater used for applying high solid lacquer type coatings. Photos John Waldron Corp.



***Yes* We Have WAX
COATING EQUIPMENT
FOR**

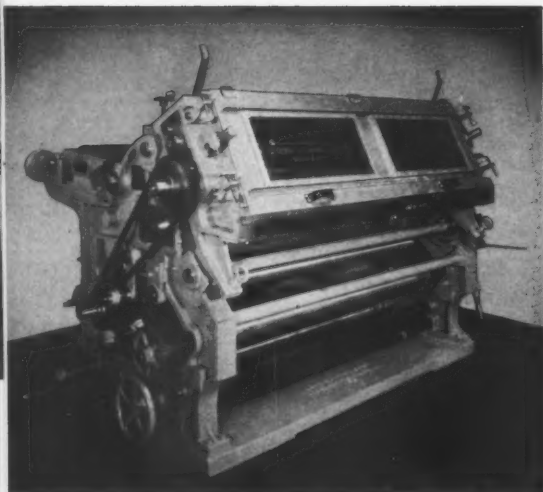
Either Filled or Knocked Down Cartons



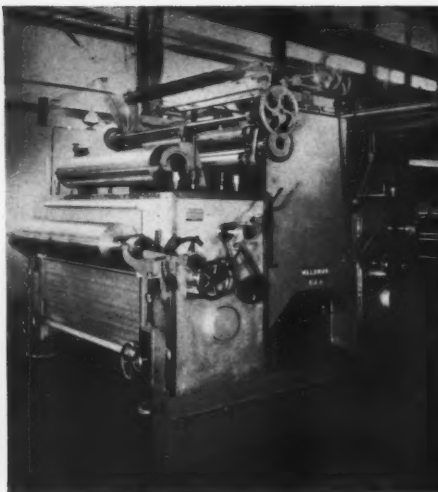
Ration "K" or dried whole egg cartons dipped on
our machines meet government specifications.

Richard Machine Company

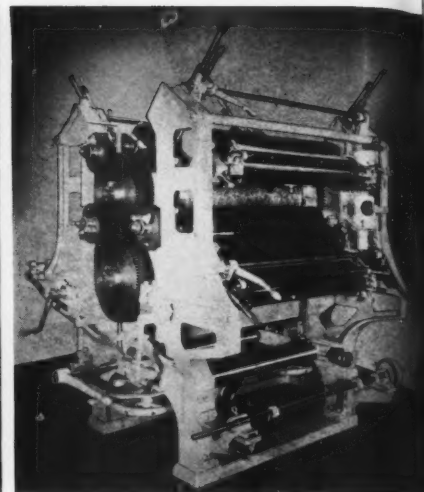
BATTLE CREEK • • • MICHIGAN



4



5



6

4. Reverse roll coater for applying lacquer and varnish coatings. These types of machines are used especially for coating papers for protection of foodstuffs. 5. Special hot melt laminating machine. This type machine used for the application of such adhesives as rubber derivatives which carry wax. 6. Print type embossing machine with four printing units. With this type, ink is laid on embossing pattern of engraved roll and transferred to surface of paper as embossing is pressed into it. Attachments for inking may be placed on a machine of this type to obtain different effects. Photos John Waldron Corp.

Chilled iron rollers are now used instead of steel or rubber-covered rollers. They produce a combined web with a finished surface that will take printing readily, and reproduce the fine lines of rotogravure printing.

For the laminating of three to five webs, a high-speed laminating machine may be used. Such machines, which can be run up to 600 ft. a minute, are being built in widths up to 100 in. or more. Electrically operated quick-lift rigs are used for lifting the top laminating roller, and the backing rollers and doctor units in the paste sections. The paste sections can handle wax, starch, silicate, or asphalt adhesives. For the application of special adhesives, such as wax-carrying rubber derivatives or other compounds, a hot-melt laminating machine may be used. Special heating elements for bearings and frames are required as enclosures with this.

If only two webs are to be combined, a small two-ply laminating unit will turn out an excellent product. This type of machine, which is of simple construction with all parts accessible, is much used for applying varnished papers to pulp board and cork. These sheets are used as lining for caps on glass containers of preserved foods.

Laminating machines are producing sheets in which several webs of chip are combined, and finished off with liners of news litho, glassine, or acetate webs. They are also being used for the combining of metal foil or cellulose fibre to paper and board.

Embossing

Paper or board may be made more attractive by embossing, which adds depth and tone to a printed surface. This treatment tends to soften paper and is occasionally used to break paper that tends to curl from any cause.

Where strength is required, therefore, an embossing operation would not be recommended.

For the embossing of paper or board, a hydraulic machine offers many advantages. Since the rollers are mounted in sub-frames, they can be quickly removed. This permits an operator to use one frame with several sets of rolls.

Most designs can be embossed without difficulty. Some designs offer a problem because the varying depth of the engraving makes the winding operation difficult. Hydraulic embossing units produce a uniform pressure across the face of the roller and turn out a uniformly embossed web. An interesting combination is *print embossing* in which the ink is laid on the embossing pattern of the engraved roll and transferred to the surface of the paper as the embossing is pressed into it.

Inking attachments can be mounted on the embossing machine. The ink is either laid in the low spots of the embossing, kissed on the high spots (for shadow effects), or applied in varying combinations of the two. Still another effect can be obtained by applying ink to the surface of the paper as it passes around the paper roll. Ink-embossed effects in multi-colors are used to advantage on stocks for labels, catalogs, or covers.

Another method of embossing is obtained by running an engraved roller in contact with a paper roller without gears. The paper roller is moved from side to side in the machine to iron the surface of it. Thus a flat-back embossed effect is obtained. The paper stock is embossed only slightly, but it is attractive for art work, stationery, greeting cards, and favors. Boring the steel engraved roll helps to bring out good effects in sharp relief and also to speed up the output of an embossing machine.

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War Changes Shipping Practices

by G. R. Browder

AMONG the changes brought by the war, one outstanding accomplishment has been the successful development of weather proof shipping boxes, both corrugated and solid fibre.

The urge behind this development was the requirement of Army, Navy and Federal Surplus Commodity Corp., purchasing for lend-lease, all of which requires a box of sufficient sturdiness to withstand the extraordinary handling conditions and cargo pressure incident to the overseas shipping of canned and other foods and subsistence supplies.

Boxes used for these purposes are also subject to unusual conditions of low temperature in certain areas and to excessively high temperature in other areas, together with atmospheric changes as well as exposure to rain where the boxes might be held for a long interval in exposed locations.

All of these conditions presented a problem, the solution of which could hardly be envisioned, and many felt that there were indeed insurmountable obstacles, but, thanks to ingenuity and experimentation on the part of chemists, paperboard mill operators and fibre box manufacturers, these obstacles were successfully overcome. Fibre boxes of both corrugated board and solid fibre have been developed which in actual experience have met all the conditions required. As a result, many millions of such boxes have been used for important export shipments.

This outstanding development is of great interest to the fibre shipping container industry which looks forward to the use of boxes of this kind for service in post-war days in the packing, handling and distribution of many perishable foods. This will include fresh fruits and vegetables which were not, to any extent, shipped in fibre boxes in the past because no fibre container was readily available that would stand up under cold storage, refrigeration and the other marketing conditions met with in this trade.

The War Production Board indicated an interest in this general subject and as early as May 1942 approached the fibre box industry with a request that studies be made of suitable paperboard and designs of packages for shipping of fresh fruits and vegetables. This was desired as a precaution against the time when there might not be available a sufficient supply of the usual type of wooden containers for this purpose because of anticipated heavy requirements of the War Department and the Navy for wooden boxes for packing of ordnance, equipment, subsistence supplies, clothing, shoes and other wearing apparel.

Government specifications for fibre boxes

Increased demands for shipping containers of all kinds came from the Quartermaster Corps, the Ordnance Divi-

sion of the War Department, and other branches of the service. The experience of the Regional Quartermaster Depots, arsenals, etc., demonstrated in the early months of the war effort, that the ordinary fibre package used for civilian supplies was not adequate in strength to withstand the packing, transportation and handling conditions incident to this service, so that it became necessary for the several departments of the Government to draft and publish detailed specifications for the designs of boxes, materials to be used and methods of closure for such packages. The result has been the ever increasing promulgation of packing specifications from the several governmental departments.*

All-Purpose boxes for civilian goods

During the summer of 1941 the Office of Production Management (now WPB) became alarmed as to the future supply of pulp and paperboard for the making of fibre boxes for civilian goods and for Government use. The OPM had become convinced that the supply situation was critical and that some drastic measures should be taken to conserve supplies of pulp and paperboard. This agitation was in part responsible for the nation-wide campaign which was put into motion beginning with August 1941, for the salvage and collection of waste paper suitable for re-use in the manufacture of paperboard, and it was also responsible for the pressure put upon the American Assn. of Railroads to relax the specification requirements for fibre boxes as published by the carriers.

This pressure resulted in the action which was taken by the Consolidated Classification Committee in relaxing the specifications for fibre boxes as published in what is known as Rule 41 of the Consolidated Freight Classification. Effective November 15, 1941, the caliper and bursting strength of fibreboard were reduced below the former minimum standards. While recognized as an emergency measure and so indicated by the Consolidated Classification Committee in fixing an expiration date of one year from November 15, 1941, conditions have made it necessary for the Classification Committee to extend the life of the relaxed regulations to August 15, 1943. This action has been taken notwithstanding the knowledge on the part of the transportation companies that packages of all kinds are now being subjected to greater strain, because of heavier loading of merchandise cars as required by orders of the Office of Defense Transportation, and also notwithstanding the fact that the freight claim account of the railways has shown a steady increase since the middle of 1941 and which has continued to the present time. While the relaxation of the regulations for fibre boxes is not wholly responsible for increased dam-

* See also "Government Packing Specifications."

age claims—one contributing factor, probably, being the loss by railroads of experienced men to the armed services—nevertheless it is felt the relaxed regulations have contributed to some extent to the present unsatisfactory conditions.

In connection with this subject of relaxed regulations, it should be mentioned that following the Freight Classification publication November 15, 1941, similar reductions were made in the specifications contained in the publications of the Federal Specification Board, Washington, D. C., which are known as Emergency Alternate Specifications which were made effective in May 1942. These Federal Specifications are basic requirements of several governmental departments and are used to some extent as governing specifications for boxes for the shipment of articles purchased by the Government.

Efficient packing and packaging necessary

Obviously, there is danger in introducing into the general shipping field any container which is not of sufficient strength to make a safe and serviceable package or one which may not deliver its contents in good condition at final destination, particularly in these times when waste must be prevented at all reasonable cost and effort. Shippers must also consider the fact that conservation of transportation facilities necessitates the heavier loading of merchandise cars, with a resultant greater strain upon

shipping containers and packages of every description.

Wartime shipping and transportation conditions not only require better outside shipping cases, but also adequate interior packing and cushioning to protect the goods within the container. The matter of sufficient good packing is of paramount importance in connection with the shipping of fragile articles. Each presents an individual problem. If a shipper's experience shows undue damage in the transportation of his product, he should investigate. He will find that in most instances the trouble can be rectified through the use of more, or perhaps stronger, packing, and that any added expense will be justified in order to provide a safe shipping package for the protection of his goods in wartime.

One interesting new development in the shipping of metal parts and equipment is referred to as "Method 2" and is covered by Army-Navy Aeronautical Specification AN-P-13. The method was worked out cooperatively as a result of the efforts of Army and Navy engineers in conjunction with commercial concerns who supply and fabricate the materials. Briefly, it involves the use of an envelope or sack made of transparent moistureproof film inside of which are placed several containers of the highly hygroscopic substance, silica gel. This method permits machine parts to be put into immediate use on arrival at the point where they are needed, saving the time formerly spent in cleaning off the protective grease.

Standard Shipping Practices

by J. D. Malcolmson

THE preceding article reviews some of the changes in shipping practice which the war has brought. For the most part, however, the standard practices remain in force, and this article serves to summarize them, at the same time directing the reader to sources where more detailed information may be obtained. Many of the subjects are also treated more at length in this edition of the **PACKAGING CATALOG**.

Shipping agencies in the United States include rail (freight, express, baggage and parcel post), trucks, ships and airplanes. While airplane shipments of freight are new and very small proportionately, the end of the war will undoubtedly leave thousands of planes looking for new uses and scores of plane factories looking for new outlets. One logical peacetime outlet is air freight and we are destined to see great progress here in the years to come. It therefore behooves shippers to start thinking about strong lightweight containers adaptable to airplane shipments.

Today, however, the great bulk of merchandise travels by rail freight and the following considerations are, therefore, directed chiefly to this method, remembering that trucks and, to a lesser extent, other methods of

transportation follow similar general principles. Our interest here, therefore, is in freight and particularly in the methods of packaging merchandise for LCL freight since many C/L shipments are bulk while most LCL shipments are packaged.

Official container regulations

To play any game properly, it is first necessary to know the rules. These rules on shipping methods are quite complicated in the aggregate, but become simpler when properly broken down. Although we can touch only the high points here, it is well to consider the most important ones, which are:

Consolidated Freight Classification Rules 5, 40, 41.
Motor Truck Classification (interstate and common carriers).

Official Express Classification Rule 18.

Bureau of Explosives—dangerous articles by freight, express, baggage, motor vehicle (highway), steamship and water (ships).

Parcel Post.

Freight Container Bureau (perishables such as fruits and vegetables).

U. S. Government Federal Standards (there are several hundreds of these).

U. S. Treasury Department Regulation No. 6 covering bottled-in-bond spirits.

There are no uniform specifications for trans-ocean shipments.

There are no official airline specifications.

Freight: The freight regulations are fairly complicated at first glance. Thus, it is first necessary to look up your product under the commodity rate tariff of your individual railroad Association (for instance, the New England Freight Association). This is assuming that the shipment would move at commodity rates. However, if it moves under exceptions to the classifications, it is necessary to refer to the "Exceptions to Classification" published by the Associations. If it moves under the classification ratings, it is then necessary to refer to the Consolidated Freight Classification. In other words, commodity rates take precedence over the exceptions and the exceptions, in turn, take precedence over the classification. The above is necessarily a very brief and general description of one of the most complicated subjects that a traffic manager has to become familiar with.

Actually the Consolidated Freight Classification is the reference in most use as this large volume lists each commodity giving in most instances the form of container to be used. These containers in turn are described in detail in Rules 40 and 41 at the end of the book and also under the special container descriptions printed on the blue colored pages near the end of the book.

The Consolidated Classification book may be consulted at 143 Liberty Street, New York, or it may be secured by subscription from the Consolidated Classification Committee, Union Station, Chicago. The subscription rate is \$2.50 per annum and includes all supplements.

Motor trucks: This form of transportation has now become so popular that there are several classification books available, the principal one being the "National Motor Freight Classification" published at 1013 Sixteenth Street, Washington, D. C. This also lists the various commodities and states how they should be packed, for instance "bags, boxes, barrels," etc., but does not require that these containers conform to any detailed specification. A movement is now under way to bring these containers into line with the present freight specifications.

Bureau of explosives: The shipment of all dangerous articles comes under the control of the Bureau of Explosives, 30 Vesey Street, New York, and their published regulations take precedence over the standard freight, express and other requirements. These regulations apply on all methods of transportation and a copy may be secured on application. The Bureau of Explosives is a division of the Interstate Commerce Commission whereas the Classification Committees are not Federal, but are merely representatives of all the railroads of the country.

These Bureau of Explosives regulations cover inflammable materials, explosives, fireworks, poisons and other dangerous articles. In many cases special requirements must be complied with when packing this type of merchandise, such as the use of labels and special printing copy. Because of the dangerous nature of this merchandise, the Bureau has to impose stricter requirements than in the case of ordinary freight and has to be very efficient in policing and enforcing these rules. As a result, however, the transportation systems of this country have an enviable reputation for the safe handling of explosives and other dangerous articles running back over a period of a great many years.

Parcel post: The Post Office Department does not issue detailed packing specifications, although they do maintain a "Classification Department" at the New York City General Post Office. Rules may be studied by consulting the Postal Regulations or specific pamphlets available at all post offices. In case of doubt, submit your proposed package to your local postmaster. Parcel post packages must not exceed 70 lbs. in weight nor 100 in. in length and girth combined which is equivalent to "height plus waist measure."

Perishables: In July 1935, the Freight Container Bureau was given full jurisdiction over all containers carrying fresh fruits and vegetables. The Bureau not only issues its own dockets and specifications, but also designs containers, writes specifications and assists in developing new packages or in trying them out on official test shipments. These regulations take precedence over the freight classification.

U. S. Government specifications: Until recently each branch of the Federal Government maintained an independent set of container specifications. This confusion was largely eliminated a few years ago by the establishment of the "Federal Specifications." However, the Army, Navy, Marine Corps and others still keep many of their own specifications in force. For instance, the Army publishes an "Index" of specifications covering 250 pages and listing about 6,000 individual items. All of these listings carry a coded number such as WW-P-377 which, in turn, refers to a separate pamphlet procurable from the Superintendent of Documents at a cost usually of 5 cents and this pamphlet, under paragraphs G and H, describes the form of shipping container to be used for that particular commodity. Thus, the recipient of a contract for spaghetti, for instance, finds in the Index that this is specification No. N-M-51. He then has to secure this pamphlet which describes in detail just how the spaghetti must be made and paragraphs G and H tell him how it must be packaged and shipped. In some cases these container requirements are specific while in other instances they simply state "commercial containers may be used." In other instances, the reference may be to the general Federal container specifications, some of which are as follows:

Specification LLL-B-631a—corrugated containers.

Specification LLL-B-636a—solid fibre containers.

Specification NN-B-601—cleated plywood boxes.

Specification NN-B-621—nailed and lock corner wooden boxes.

Specification NN-B-631—wire bound wooden boxes.

The Treasury Department also has some specifications of its own. One of these is known as "Regulations No. 6" and covers all containers for the shipment of bottled-in-bond spirits and this takes precedence over all other regulations.

Canadian requirements: While Canadian regulations are not as voluminous nor as detailed as those in the United States, they follow in general the American specifications very closely. This is especially true for freight.

Test shipments: The carriers recognize that constant experimentation is the road to improved containers and reduced damage claims. For that reason, they are very lenient and cooperative in regard to legitimate test shipments of new containers. Sometimes these can be

Fibreboard Boxes in Common Use

Maximum Weight of Box and Contents (Lb.)	Maximum Inside Dimensions, Length, Width and Depth Added (In.)	Solid Fibreboard		Double-Faced Corrugated Fibreboard, see Notes 2 and 3		
		Minimum Thickness of Board (In.)	Minimum Test per Sq. In. (Lb.)	Facings		Minimum Test per Sq. In. of Combined Board (Lb.)
				Minimum Thickness (In.)	Minimum Test per Sq. In. (Lb.)	
All Fibre Boxes Not Otherwise Provided for Below, see Section 4						
20	40	.045	125	.009	...	125
40	60	.060	175	.016	85	175
65	65	.080	200	.016	100	200
90	70	.100	275	.030	135	275
Two Complete Double-Faced Corrugated Boxes, One Fitting Closely Inside the Other, see Section 4						
90	70	...	...	.016	85	(Each Box) 175
Double-Wall Corrugated Boxes, see Section 4						
65	65	...	...	2 Outer .016	†85	200
90	70			1 Center Liner .016		275
120	100	...	...	2 Outer .030	200	500
140	115	...	...	1 Center Liner .016	100	600
				3 Liners .030	200	

† No test required for center liner for 65-lb. box.

arranged for by conferring with the carrier involved while the Freight Container Bureau and the Freight Classification Committee have definite procedures for carrying out such test shipments. In respect to freight, this procedure is described in detail in Rule 49 which has recently been added to the Consolidated Classification.

Fibre containers

Inasmuch as fibre containers are still relatively new in comparison with wooden boxes, it is necessary to comply with certain legal regulations when using these containers for shipment. The principal regulations are as follows:

Rail freight: The regulations for freight shipment of merchandise in fibre containers are promulgated by the Consolidated Freight Classification representing about 950 participating railroads and coastwise steamship lines. The services of an expert traffic man are required to decide whether a given product comes under the commodity rate tariff of an individual railroad association, under exceptions to the Classification or under the Classification ratings themselves. In the latter event, the requirements are uniform for all carriers and the detailed specifications covering the use of fibre containers are contained in Rules 5 and 41 of the "Consolidated Freight Classification." This is a book about the size of a telephone directory and may be secured from the Classification Committee, 202 Union Station, Chicago, Ill. The subscription charge is \$2.50 per year which includes all supplements. Every shipping man should subscribe to this service as the book not only contains all rules and regulations covering freight shipments and packing specifications for articles in fibre containers, but also lists the individual commodities together with prescribed methods of packing each.

Rule 5 states that "all containers must be such as to afford reasonable and proper protection to contents" and also defines such words as "packages," "bale," "bundles," "boxes," etc. Rule 41 defines "boxes" of various accepted styles and describes how they should be manufactured, sealed, tested and otherwise made ready for shipment. Inasmuch as each of these words has a very definite meaning, the definitions are shown below.

When the item is specified "in boxes," it means that when corrugated and solid fibre boxes are used, they must conform in all respects to the specifications in Rule 41. This includes many patented or infrequently used boxes and the following table from Rule 41, therefore, shows only the boxes in common use and not the unusual styles. Wartime pressure has been responsible for considerable progress in the development of new types of packaging, particularly in fibreboard containers. Details of most of these developments generally can be ascertained through perusal of the most recent Army-Navy specifications for such containers noted elsewhere in this issue of PACKAGING CATALOG. Note, also Army-Navy Specifications for nailed and wire-bound shipping boxes.

The only other definition of "boxes" is found in the furniture classification where a box may measure up to 85 in. on 200 test and 100 in. on 275 test.

The words "bales" or "bundles" mean in reference to corrugated or solid fibre boxes that the weight and dimension limits may be disregarded provided that if the box is oversize or overweight, it must be "securely bound" with metal straps, wire or ropes. Sometimes bales or bundles are charged a premium of 20 per cent over the "in boxes" freight rate. The details of this ruling are too lengthy to repeat here but any shipper planning to use bales or bundles should first carefully read and understand Section 3-D of Rule 5 to make sure of using the package which shows the lowest net cost and freight rates as balanced against the cost on an oversize or overweight box.

The term "in packages" is almost as lenient as the term "loose" and means in effect that no packaging requirements are imposed provided the carrier considered the package to be "reasonable and proper protection" under the wording of Rule 5, Section 1. Applied spe-

cifically to fibre containers the term "in packages" means that a box or wrapper may be used without regard to style, test, size, weight or sealing methods.

"Wrapped" is a term usually applied to furniture shipments and means that all finished surfaces and upholstered parts must be protected and wrapped in a choice of indicated materials, one of which is usually fibreboard. No restrictions are imposed regarding the style of the box, its strength or sealing methods. Often creased sheets or semi-boxes are used secured with metal straps.

Occasionally one encounters the term "in cartons—See note" and this usually refers to a specific exception which differs from Rule 41. There are many hundreds of such exceptions so that it is always desirable to look up any new items to make sure of the exact form of packing required.

All fibre containers conforming to the Rule 41 definition of "boxes" must carry a circular boxmaker's certificate. If oversize or other containers not conforming to Rule 41 are permitted, a rectangular certificate is required with the name of the item included such as "Box for Brooms." Packages containing fragile articles or articles in glass or earthenware must be marked "Fragile—Handle With Care" or similar precautionary marks (Rule 6, Section 2).

When used for LCL shipments boxes must either show description of contents or an identifying symbol or number which must be explained on the shipping order and bill of lading (Section 7-B). The bill of lading must also be endorsed, "The fibre boxes used for this shipment conform to the specifications set forth in the boxmaker's certificate thereon and all other requirements of Rule 41 of the Consolidated Freight Classification" (Section 7-C). Many new users of fibre containers have been puzzled by 20 per cent penalties assessed on the freight charges due to failure to endorse the bill of lading in this manner.

Dangerous articles: In the present connection the expression "Dangerous Articles" includes explosives, fireworks, ammunition, inflammable materials, corrosive liquids and poisonous substances. The regulations covering the shipment of dangerous articles are issued directly from the Interstate Commerce Commission through the Bureau of Explosives and take precedence over all other freight regulations including every form of transportation. Naturally these regulations are more severe than for ordinary freight and are more rigorously enforced. The reason for this is obvious and in actual practice this strictness has paid big dividends in human safety and material savings.

For instance, in normal years 500,000,000 lbs. of explosives are shipped over our transportation system and for a period extending well over ten years this shipment has resulted in no damages, no injuries and no deaths. The Bureau of Explosives was first created in 1905 and the complete regulations governing shipping containers may be secured in the form of a bound book by applying to the Bureau at 30 Vesey St., New York. From time to time supplements to this book are mailed to subscribers and several times a year a docket is published listing applications for changes which have been requested by shippers or proposed by the docket. Reference to the Bureau of Explosives regulations will also be found in Rule 35 of the Freight Classification.

Effective January 7, 1941, the Bureau of Explosives was greatly simplified so that in place of the many specifications previously applying on fibre containers the new regulations concentrate all of these into one single group known as specification ICC-12B. Other minor specifications are still retained such as 12C and 12E which

refer to patented and other seldom used containers. Among the simplifications effected in the new regulations was the elimination of ICC requirements for the shipment of paints, lacquers, etc., by freight (but not by express) and an increase in the weight limits for exemptions on certain other items. Shippers of dangerous articles should study these new regulations carefully as otherwise they may be using a container more expensive than required. Also the great expansion in national defense means that many industries will be shipping ammunition and other dangerous articles for the first time.

The Bureau is very strict in regard to its requirements for labels and markings. Certain boxes must carry a distinctive colored paper label. For instance, a red label is used for inflammable liquids and a yellow label for matches. These labels may be purchased from the Bureau or may be printed in the correct color on the container by the boxmaker. In other cases where no label is required the box must be printed, "No label required." This is especially true of freight shipments as most express shipments must carry labels. In addition nearly every item requires certain type matter on the box such as "Handle carefully," "Keep fire away," "This side up" and most often the name of the contents. The bill of lading and shipping order must also be endorsed with certain statements such as reference to label requirements. Cars also in some cases must be placarded. These details are important and overlooking them will lead to annoyance and delays.

Effective March 1, 1935, the Bureau also took charge of shipments of dangerous articles on interstate common carrier motor trucks, which means that all the regulations applying on this merchandise when moved by rail freight must also be complied with for truck shipments. As mentioned in a previous paragraph, this is not the case on non-dangerous articles.

At about the same time the Bureau also issued regulations covering the transportation of this merchandise on freight and freight-and-passenger vessels.

Express: Shipments in fibre boxes by express must comply with the regulations of the Official Express Classification and particularly with Rule 18 of that classification. This pamphlet may be secured by application to the Railway Express Agency, Inc., 230 Park Ave., New York. The subscription is free on application and supplements are issued from time to time although only two supplements are in effect at any one time. Changes are less frequent than in the Freight Classification and are often arranged informally without regular docket hearings. Rule 18 follows the freight Rule 41 very closely but in a more abbreviated form. The principal differences are that on packages weighing 35 lbs. or less a non-conforming box will be accepted unless such package exceeds 50 united in., in which case they must also be crated or "securely wrapped." There are certain exceptions to this rule and these are listed in the Classification.

The other important difference is the fact that all regular express boxes will be accepted up to 90 united in. and the gross weights vary with the strength of the board. Some merchandise will not be accepted by express in fibre containers. This includes mirrors (valued at over \$2.00), statuary and about a dozen other miscellaneous items.

Motor truck: There are today no motor truck regulations covering the strength and construction of fibre-board boxes and theoretically any under test container can be used, in which case the truck would have a de-

cided advantage over the railroad. Discussions are now under way with the object of developing uniform strength regulations for both trucks and rail freight.

Parcel post: The Post Office Department has not issued any blanket order containing specifications for fibre containers. Scattered through their other publications, however, will be found items where corrugated boxes are specifically recommended. These include valuable or breakable merchandise such as cigars, cut flowers, liquids in glass and the like. The parcel post regulations recommend the use of strong wrapping for outer packaging and since the post office looks on fibre containers as excellent answers to this requirement, a great many corrugated boxes are in daily use for parcel post shipments. In addition to offering protection, these boxes are easy to seal efficiently, are light in weight and make a good appearance. Such packages may not exceed 100 in. in length and girth combined. In measuring a parcel the greatest distance in a straight line between the ends is taken as the length and the distance around the parcel at its thickest part is taken as the girth. Shipments of liquids in glass are accepted up to certain definite limits but this does not apply on liquor. The limits are much lower on inflammable liquids.

In general the parcel post requirements are difficult to interpret and apply on new or unusual packages and in such cases the safest procedure is to submit such a package in its final form to the local postmaster before instituting shipments.

Wooden containers

Crates: The simplest form of wooden container is the ordinary crate. Actually the modern crate is not at all simple since an enormous amount of engineering study has been devoted to its structure in order to combine the maximum of strength with the minimum of expense. Much of this research was carried out by the Forest Products Laboratory at Madison, Wis., augmented by the engineering staffs of the larger producers of lumber and wooden containers. The Forest Products Laboratory has published its findings in a series of bulletins and all crate users should own and study these publications. Not only are the best designs illustrated, but valuable information is also given regarding the proper kind and use of nails for each size and style. This is of paramount importance inasmuch as the method of nailing often means the difference between a good crate and a bad crate. The general Freight Classification specification (Rule 40, Section 2) for crates is very brief, simply stating that they must be made of wood to protect contents on the sides, ends, top and bottom and so constructed that freight may be taken in or out of the car within the crate; that contents must be securely held within the crate, and that no part of the contents shall protrude. Surfaces liable to be damaged must be fully protected. A detailed description of crates for specific merchandise will be found under Paragraphs Nos. 525 to 568, inclusive.

Wood framed containers: Progressing from the open crate, we come to the wood framed container which can be considered as a crate with enclosed panels. These panels protect the contents from the weather, dust and outside contact. Originally these panels were made of plywood and many still are. Later, solid fibreboard and occasionally corrugated board were substituted for veneer in the interest of economy, lighter weight, and to furnish a surface for display printing. Typical uses are for ship-

ping console radios, cabinets, textiles and other large objects which are not excessively heavy.

The freight specifications for wood framed containers, either corrugated or solid fibre panels, will be found in Section 3 of Rule 41 of the Classification and specific styles are described under Packages Nos. 781, 785, 824, 839, 853, 874, 885, 888 and 915.

Wire bound boxes: These are essentially wood framed veneer panel boxes except that the patented construction permits them to be delivered KD as shoos and they have a lid which can be opened and reclosed. The ingenious use of attached wire reinforcement permits of considerable economies in cost and weight without sacrificing strength. Much of the income from royalty is plowed back into continuous research and sales promotion. Examples are the recent experiments with fibreboard panels and development of a new standard non-bulging crate for citrus fruits.

Wooden boxes: We now come to the old reliable standard wooden box. However, it also has received a lot of scientific study and has developed into many specialized forms for specific purposes. Thus, there are uncleated boxes, others with cleats either outside or inside and various forms of end framing. Some are tongue and grooved, others have lock corners, while special styles are built to order for many specific purposes. In all styles, however, nailing is of utmost importance. The nails must be the right size and kind and they must be driven properly. Here again the Forest Products Laboratory has contributed valuable scientific data which are available to anyone interested.

The railroads do not attempt a general description of wooden boxes other than to say (Rule 40, Section 1(a)) that they must have "solid or closely fitted sides, ends, tops and bottoms securely fastened" and that (Rule 5, Section 1(a)) they must be "in such condition and so prepared for shipment as to render the transportation thereof reasonably safe and practicable." Incidentally, this last clause applies on *all* shipments tendered for freight regardless of the container used. Detailed descriptions of wooden boxes for specific merchandise will be found under Packages Nos. 179 to 274, inclusive.

Miscellaneous containers

The Freight Classification recognizes a number of other types of containers and a brief reference to them follows:

Baskets: These include baskets made of steel, wood, rattan, splint, bamboo, staves, veneer, willow and wicker. All of these and a few others will be found under Packages Nos. 146 to 169, inclusive, at the end of the Classification book.

Hampers: These are usually made of rattan or canvas, the latter sometimes being lined with wire netting. See Packages Nos. 602 to 606, inclusive, for details.

Marking

The need for plain legible marking on containers is obvious, but too often ignored. For instance, great care should be observed in showing the correct state in which the town is located and writing or stenciling this state or its abbreviation should be done very legibly. The reason for this is the almost unbelievable duplication of place names in the United States. Thus, there are 88

towns by the name of Summit and 23 different city names occur in the United States over 20 times each. Other common examples are Washington, Springfield and Manchester. Mass. is often mistaken for Miss., Cal. for Col. and Me. for Mo. Care should always be observed in obliterating all old marks and in the use of plenty of ink with brushes. Free-hand lettering should be avoided and a stencil cutter will soon pay good dividends in accuracy and in improvement of container appearance.

Cabinets: Packages Nos. 430 to 433, inclusive.

Carriers: This form of container is used for shipping such items as empty glass bottles, bananas, oysters and foods refrigerated with either water ice or dry ice. These refrigerated carriers are insulated. Carriers are often mounted on wheels. Details are shown under Packages Nos. 460 to 473, inclusive.

Trunks: Trunks are often used for such items as salesmen's samples and are listed under Packages Nos. 714 to 718, inclusive.

Egg cases: Egg cases for freight are usually made in standard styles of wood although recently solid fibre and corrugated have been added. Detailed specifications will be found in Packages Nos. 511 and 512 while Package No. 893 describes the fibreboard case for shipment of small quantities.

Racks: Packages Nos. 690 and 691.
Reels: Packages Nos. 695 and 696.
Rolls: Packages Nos. 700 to 708, inclusive.
Tubes: Packages Nos. 720 and 721.
Trays: Packages Nos. 789 and 875.
Beams: Package No. 790.
Ballots: Package No. 768.
On Boards: Package No. 769.
Flasks: Package No. 774.

Shipments without containers

Any discussion of shipping methods must include the various methods of making "loose" shipments. At first glance this does not seem very complicated or scientific. Nevertheless, great strides have been made in recent years in the perfection of methods for loose shipping.

The original and obvious loose shipment consists of large bulky items, such as machinery, automobiles and other merchandise either too large to go in a container or else of such a character as to render a container unnecessary. Inasmuch as many of these items are non-recurring and have their shipping and bracing methods worked out individually, it is not possible to cover them in an article as short as the present one. Also it is not desirable to discuss here the shipment of such bulk commodities as coal, grain, etc., except to point out that even here new developments are constantly being adopted such as the carload shipment and handling of bulk cement, molten asphalt, fluid milk, acids and various chemicals.

Of chief interest to us, however, are the many novel methods being used as an intermediate stage between bulk and package merchandise. The modern scientific study of metal strapping and its uses has been one of the chief contributing influences. The proper use of metal strapping has developed within recent years a whole new technique in loading and bracing merchandise in freight

cars. One modification is referred to as "unit loading" wherein the contents of a freight car are divided into units which, in turn, are held together with metal straps. Other straps anchor the unit to the car but at the same time provide enough "give" to absorb the impacts of train switching. As a result, greater economy and efficiency have been made in the C/L shipment of such merchandise as automobile frames and other chassis parts, rolls of paper, sewer pipe, drums, barrels, crates (particularly for fruits and vegetables) and similar items. Other modifications of these methods are "bulkbinding," "anchor strapping" and "Conbur bracing."

Complete technical information and assistance is readily available to all shippers on application to the manufacturers of metal strapping or to the various railroad and government agencies such as the Freight Container Bureau (Conbur), the various Shippers Advisory Services, the Transportation Division of the Association of American Railroads, the Mechanical Division of the A. A. R. and the Forest Products Lab. at Madison, Wis.

The Freight Classification also gives much detailed information on this subject under Packages Nos. 478 to 485, inclusive, and 625 to 655, inclusive. These include methods of bracing and protecting such loose items as pianos, canoes, bottles, building tiles, crucibles, sewer pipe (including the "double unit method") and others.

Bracing: Great improvements have been made in methods of bracing, dunnage (see Rule 30 of the Classification), protection at car doors and proper storage in the car. Consult the Transportation Division of the A. A. R. for their voluminous illustrated data. A notable and extremely recent development involving the latest technique in metal strap bracing has been the skillful methods worked out for the boxing and securing of aircraft for rail transportation on flat cars. Two different companies are now specializing on this from a nationwide standpoint.

Skids and pallets: This is another interesting method of shipping which lies between loose handling of materials and complete packaging. It probably started in the paper industry where several hundred pounds of sheets were loaded onto a plain wood skid, wrapped with water proof paper and securely strapped to the skid for shipment to the printer. Other industries, notably the manufacturers of automobiles and electrical goods, were quick to realize the advantages and economies of this method of transportation and are now using it wherever possible for shipping such items as small motors, wheels, bumpers, clutches, mufflers, fire brick, etc. Additional advantages are the speed with which these skidded units can be handled in or out of the freight car and the ease and convenience of storing.

Simple skids are also used in combination with fibreboard for the protection of heavy objects of a fragile nature such as furniture, refrigerators, ice cream cabinets, etc. Some of these are described in the Classification under Packages Nos. 678 (refrigerators), 710, 711, 712 (using insulated blanket), 752 (telephone booths), 754 (furniture) and 824 (refrigerators).

Another modification is that of strapping several items together without a skid and without any outer container although it is sometimes desirable to have protection between the items. Examples are auto springs, auto fenders, hides, etc.

Shipping Cases of Corrugated and Fibre

by J. D. Malcolmson

THE term "fibre containers" includes both corrugated and solid fibre containers. In 1940 over 93 per cent of all fibre containers were corrugated and less than 7 per cent were solid fibre. This preponderance of corrugated has been growing because the respective proportions in 1930 were 76 per cent and 24 per cent.

Although corrugated paper was first patented in 1871, it was not until 1903 that corrugated freight boxes were first used. They were authorized by the Official Classification in 1906 and then had to defend themselves against the wooden box industry in the famous Pridham case (1912), which was decided in favor of the fibre container in 1914. Solid fibre was developed and recognized at approximately these same dates.

The growth of the fibre container industry, and particularly of corrugated, has been very rapid from 1914 to the present. The increase in terms of square footage of corrugated during the past 10 years has been from 14 billion sq. ft. to 35 billion sq. ft., the latter being equivalent to 3½ million boxes of 10 sq. ft. each. In terms of tonnage fibre containers account for about half the total amount of paperboard produced and this paperboard accounts for about 45 per cent of all the paper made in the United States, which in 1940 was over 14 million tons. Even more rapid has been the growth of the kraft liner which passed the jute liner in tons in 1938 and in 1940 had reached a total of over one million tons (932,000 tons of Fourdrinier and 246,000 tons of cylinder) as compared with 800,000 tons of jute.

Principal advantages of the fibre container are comparatively low first cost, light tare weight, saving in space gained by storing KD (knock-down) boxes, ease of sealing and handling, ability to take effective multi-color printing, sanitary single use and avoidance of concealed theft due to the fact that a properly sealed case must be practically destroyed to open.

Styles of fibre containers

While a great many styles are available, the most important ones are: (See pages 551 and 552)

Regular slotted carton: in which all flaps are the same length making for economy since these flaps are cut in a single straight line operation. This is the most popular style.

Special slotted carton: This refers to variations in flap lengths such as all flaps to meet or outer flaps with partial or full overlapping flaps. If the outer flaps are of a different length than the inner flaps, an extra expense is entailed for "flap cutting" and it is, therefore, sometimes cheaper to use an overlapping style in place of a flap cut style even though the former may have more sq. ft. of board.

Other styles: These include two- and three-piece boxes, telescope designs, one-piece folders and numerous others, some of which are patented. Corrugated boxes are usually made on straight line, high-speed, automatic equipment. Thus the cheapest styles always have every cut and crease running at right angles to

each other and to the outside edges of the blank. A style that contains a curve or an angle between the cuts or creases (other than a right angle) will cost more since it involves special equipment which is usually in the form of die cutting. This means a considerable preparation charge in making up the cutting and creasing die and a slower manufacturing operation. Also, die cut samples must be purchased in large quantities so as to distribute preparation costs, whereas slotted cartons and other right angle styles are run on rotary equipment requiring little in preparation or make-ready.

Nomenclature

The following is a glossary of some of the more important technical phrases used in regard to fibre containers. Also, see Wood Pulp in Paperboard Industry, page 63.

Fibre containers: This term includes both corrugated and solid fibre boxes.

Corrugated board: In its simplest form corrugated board is "unlined," which is simply a bare piece of corrugated paper such as was originally used for wrapping lamp shades and similar items. If one facing is applied, the product is known as "single-faced board;" with two facings it is called "double-faced board;" with three facings and two corrugations the result is known as "double-wall board."

Corrugations: Corrugations may be made (under railroad rules) of any material that will "produce finished board of adequate rigidity" (Section 2, Rule 41). Until recently this rule itemized the permissible materials to be used in making corrugations.

Mullen or Cady test: This refers to laboratory instruments which measure the bursting strength of the board in terms of "approximately" lbs. per sq. in.

Certificate of box maker: This is sometimes known as the "imprint" or "Classification stamp." It certifies that the container complies with all railroad regulations as well as identifying the boxmaker.

Point: A "point" is one one-thousandth of an inch. Thus a .060-in. board is referred to as "sixty point board."

Dimension sequence: In specifying dimensions always use the distance between the openings as the last dimension and the larger of the remaining two as the first dimension.

Joint and seam: The railroads define joint as the result of the operation done by the box-maker in taping or stitching the fourth corner of the box. The seam is the juncture formed by the shipper in sealing the box with gummed tape.

Manufacture of fibre containers

Fibreboard and its products are made almost entirely on high-speed, straight-line, rotary equipment. In other words, gigantic rolls of fibreboard are the box shop's raw material. In making corrugated board, one of these

rolls is fed into a pair of metal corrugating rolls which essentially are meshed gears anywhere from 4 to 7 ft. wide. The application of heat and moisture causes the corrugation to retain its shape and, almost simultaneously, the two outer facings, feeding in from other rolls, are glued to the tips of the corrugations. In the case of solid fibre, the sheets coming from the rolls are simply laminated together by having the surfaces of the inner plies entirely covered with an adhesive. In both styles of board the freshly combined web is carried through driers and finally through slitting and cut-off knives which deliver blanks cut to size. These rectangular blanks are then run through other rotary equipment for creasing, slitting, slotting and printing. The blank is then formed into a box by joining with either stitches or tape and shipped to the customer in flat KD form.

Modern printing methods have made it possible to print attractive advertising copy on the smooth surfaces of the box at practically the same cost that would be required for ordinary type matter. This permits the alert merchandiser to make valuable use of this free bill board space.

A corrugated box depends largely for its rigidity on the invisible corrugations. The blank goes through the various operations of the box shop without distortion of these corrugations so that the final box possesses maximum rigidity. The true shape of these corrugations cannot be observed along the edges of a box because the slitter knives have to crush these edges before they cut through. However, by going back a half inch or more from the edge and cutting through the board with a safety razor blade, it can be observed how perfectly these corrugations have been formed and how they have preserved their original shape. The corrugations contribute lightweight, cushioning to resist impacts and the most efficient insulation per dollar of any box material available.

During the development of the corrugated box, a great many different materials have come and gone in popularity. Today the trend is towards Fourdrinier kraft made in the South. This sheet possesses maximum strength, bending quality and rigidity, and provides the lightest possible tare weight, and thus, a very appreciable saving in freight.

Many special forms of containers are available, such as some protected against the passage of moisture by a buried layer of asphalt or by a surface treatment of hard wax. Others are lined with greaseproof papers for the packing of oily materials.

Testing and specifications

In the early days of the fibre container industry few if any tests were standardized, the principal one being Mullen test and caliper. As the industry expanded, more and more attention was given to testing standards and this has been greatly accelerated in recent years due to the desire of boxmakers, box users and carriers to reduce the subject to definite specifications that could be enforced and duplicated. Thus, many purchasers of fibre containers maintain laboratories for checking quality of incoming shipments and, also, include more or less detailed specifications in their contracts or inquiries. For the same reason most boxmakers operate testing laboratories and the various testing instruments are also available at the independent laboratories such as The Container Testing Laboratories, Inc., New York, N. Y., and the Don L. Quinn Co., Chicago, Ill.

The National Retail Dry Goods Association has issued a 120-page book known as the "Wrapping Supply Manual," which includes standard sizes and specifications for corrugated containers and single faced corrugated rolls. The National Association of Purchasing Agents has also published an eight-page booklet on the subject of testing and specifications of corrugated containers and another booklet describing the various types of paperboard used in making these boxes. The National-American Wholesale Grocers Association has done valuable work in the development of standards. Occasionally they issue releases known as "News Circular Service" including suggested calipers and Mullen tests for fibre can cases. Other publications are mentioned in the bibliography, at the end of this chapter.

The technical developments in the testing of fibre containers have grown so rapidly that today there are available instruments for measuring bursting strength, moisture content, weight, caliper, rough handling (drum tester), compression (not only of the finished box but of the double-faced corrugated board and the individual sheets going to make it up), impact, tearing, water-proofing, tensile strength bond between components, ink fading, crease strength, etc.

It is well to emphasize that fibre containers, as is the case with all paper products, are very susceptible to moisture gain or loss with every change in atmospheric humidity. These changes in moisture content have a very decided effect on the test of the board. For instance, a corrugated box showing a Mullen test of 240 at 40 deg. relative humidity can easily drop to 160 at 90 deg. The same effect is true to a lesser extent on the drum test and to a much greater extent on the compression test. It is, therefore, very important that in testing fibre containers or reporting on such tests some indication should be added in regard to the atmospheric humidity at the time the test was made. A great many arguments develop from failure to do this.

A-flute versus B-flute

Much confusion has been caused by the indiscriminate use of A-flute and B-flute corrugated boxes. When corrugated board was first introduced, it was all made A-flute with a corrugation $\frac{3}{16}$ in. high running about 36 to the foot. A more recent development is B-flute, corrugation $\frac{1}{8}$ in. high running about 52 to the foot. On the great majority of shipping containers it makes little difference whether A-flute or B-flute is used as far as the efficiency of the container is involved. On large cases, which are not supported to any extent by the contents, A-flute makes a more rigid wall. On very small cases, B-flute folds up more accurately and makes a more efficient container. A-flute affords a better cushion against outside blows, particularly when the contents are fragile, but B-flute is harder to puncture as the two liners are closer together and support each other in resisting the blow. For strong solid contents, such as canned goods, B-flute is very efficient particularly at the horizontal creases which are in contact with the sharp edges of the cans. B-flute board naturally occupies less space not only in the KD containers, but also in packed boxes. In one instance a shipper was able to insert an entire extra top layer of boxes in his freight car after changing from A-flute to B-flute. B-flute also resists the drastic clinching of stitching wire better than A-flute and it is more desirable on die cut work. Most double wall board is made of a combination of A-flute and B-flute. Occasionally an in-between size is used known as C-flute, which is seldom manufactured.

Army-Navy Specifications for Fibreboard Shipping Boxes

THE Government is industry's No. 1 customer today, both as to volume and importance. Always a buyer on specifications, the Government has now drawn its specifications more minutely than ever, in respect to product as well as packaging practice. The new standards are in keeping with the changed requirements of the times.

In order to have a clear understanding of the Government specifications on containers, an understanding should be had concerning the viewpoints of the agencies establishing those specifications. Some manufacturers may compare Government war packing specifications with their own export packing methods, without fully realizing that there are vast differences between even the most severe peacetime shipping conditions and those encountered today in shipments to war areas. Still more important by far is the *value* of the military shipments, not in terms of dollars alone but in terms of lives, and in terms of campaigns that might be lost through the lack of supplies or supplies received in such conditions that they were unfit for use.

The Government men realize what their stringent requirements mean in terms of cost and the disruptions upon industry involved, but they know the risks run and the losses that can result from insufficient packing. While only a portion of supplies and equipment is shipped to tropical regions, those shipments when they get to the fighting zone, must be usable. Guns and ammunition have to be in working order, replacement parts must be ready for use, food must be in good condition, communications equipment must be ready to function, and so on.

Many conditions to which shipments of war supplies are subjected are never encountered in peacetime. For instance, shipments to zones of combat are practically

never unloaded at docks or wharves or where proper handling facilities are available: warehouses or storage buildings are not to be had, and as a consequence goods must be stored out of doors, sometimes for many months. In those regions where the rainfall is extremely high, protection against water is, of course, tremendously important. Again, in many areas the means of transportation are extremely limited and therefore the weights of units must be kept down to levels that would hardly be considered practicable in peacetime.

In this war, when shipping space is so valuable, additional importance must be attached to the elimination of all possible loss through damage in transportation. At the same time, of course, the factor of displacement must not be lost sight of and judgment must be exercised in deciding upon the amount of protection that is to be provided.

The fibre box specifications now issued by the armed forces and lend-lease require materials and levels of performance that would have been considered almost fantastic before the war. They were built up as reports from overseas called for better materials, and as the container industry produced fibreboards which were superior to any ever known previously. The principal provisions follow:

Specifications for Fibreboard Shipping Boxes (U. S. Army No. 100-14)

General

Corrugated and solid fibre, *treated to be highly water-resistant*, is the only material that may be used in making fibreboard boxes to be used as exterior containers for overseas shipments of war material and supplies. Fibreboard boxes made according to these specifications may also be used for domestic shipments.

Each fibreboard box, before being packed, shall be lined with a water proof bag.

Table A—Requirements for corrugated and solid fibreboard

Grade	Compliance symbol	Corrugated fibreboard—Minimum caliper of paperboard			Solid fibreboard—Minimum caliper (ins.)	Minimum average bursting strength		Maximum weight of box and contents		Maximum sum of inside dimensions ³ (in.)
		Outer liners (ins.)	Other liners (ins.)	Corrugating material (ins.)		Dry (lbs.)	After 24 hours immersion (lbs.)	Type 1 load ¹ (lbs.)	Type 2 load ¹ (lbs.)	
1-R (double wall)	VIRC	0.030 ²	0.023	.010	.....	750	500	70	70	70
1-R	VIRS	.....	.....	.....	0.100	750	500	70	70	70
1	VIS	.....	.....	.....	.100	750	500	70	60	60
2	V2S	.....	.....	.....	.090	550	500	70	55	60
2-R (single wall)	V2RC	3.030 ²	.023	.010	.....	400	250	70	55	60
3	V3S	.....	.....	.....	.090	400	150	40	30	50
3	V3C	.023	.023	.010	.....	400	150	40	30	50

¹ See Appendix, p. 136, of the complete specification for description of types of load.

² Sum of inside dimensions are the inside length plus inside width plus inside depth.

³ Outer liners shall be 0.030 in. over-all caliper and shall consist of an inner sheet of water-resistant kraft board not less than 0.016 in. thick and a minimum of 50 lbs. per 1000 sq. ft. in weight, laminated with asphalt to an outer sheet of 42 lb. (24 × 36—500 ream basis) high wet strength kraft paper, and shall have reinforcing fibres running in both directions spaced not further than 1/4 in. apart completely imbedded in the asphalt. The melting point of the asphalt shall be approximately 190° F. and the asphaltic bond shall perform satisfactorily under a temperature range from -30° F. to 150° F. The average tensile strength of the outside liner shall be not less than 275 lbs. lengthwise and 220 lbs. crosswise per 2-in. test strip. Board shall be combined with a water-resistant adhesive which will withstand the ply separation test specified in par. 45 (d).

GENERAL NOTE: All component parts shall be heavily sized, dense, highly water-resistant paperboard especially made for overseas shipment and shall be combined with a water-resistant adhesive that will withstand the ply-separation test specified in paragraph 45 (d). Corrugations on corrugated fibreboard shall be B or C flute having approximately 50 or 42 corrugations per ft., respectively.

Application

(a) Corrugated and solid fibreboard boxes may be used as shipping boxes only for articles that are not easily susceptible to damage that might be caused by such distortion of the container as is likely to be brought about by external forces during transportation. The articles to be packed in fibreboard shipping boxes shall be type 1 or type 2 loads and shall support the box so as to assure adequate stacking properties on all surfaces. Proper additional packing may, in some instances, convert a type 3 load to a satisfactory type 2 load.

(b) Articles that are not easily susceptible to damage and that, when packed in a box, do not support the box, shall be packed in interior containers or other forms of packing, which, when packed in the shipping box, support all surfaces of the box.

(c) *Articles liable to sifting or leakage*—All dry articles in bulk, liable to loss from sifting or leakage, must not be shipped in fibreboard boxes, unless packed in an inner bag, carton or other siftproof container.

(d) *Dangerous articles*—Dangerous articles, as defined by the Interstate Commerce Commission regulations, including corrosive materials, poisons, etc., are not to be packed in corrugated and solid fibreboard shipping boxes unless such boxes also comply with the requirements of the Interstate Commerce Commission.

Styles of boxes

(a) Only the following styles of corrugated or solid fibre shipping boxes may be used:

RSC-SL—regular slotted style with sleeve (Nos. 1 and 2).

CSC-SL—center special slotted style with sleeve (Nos. 3 and 2).

FTC—full telescope-design style (No. 4).

SFF—special full-flap slotted style (No. 5).

FOL—full overlap slotted style (No. 6).

(b) The inside dimensions of the box shall be expressed in the order of length, width and depth in which the flap area (the open face of the box) forms the length and width.

Materials

(a) The minimum specifications for corrugated and solid fibreboard to be used for making shipping boxes are given in Table A for each grade of fibreboard permitted.

(b) *Limitations of weight and dimensions*—The grades of corrugated and solid fibreboard given in Table A, when used for fibreboard shipping boxes, are subject to the limitations of gross weight and dimensions given in Table A.

(c) *Bursting strength test (dry)*—Specimens shall be cut from sound, unscored sections of boxes conditioned for not less than 3 hrs. under normal atmospheric conditions, 50 to 70 per cent relative humidity.

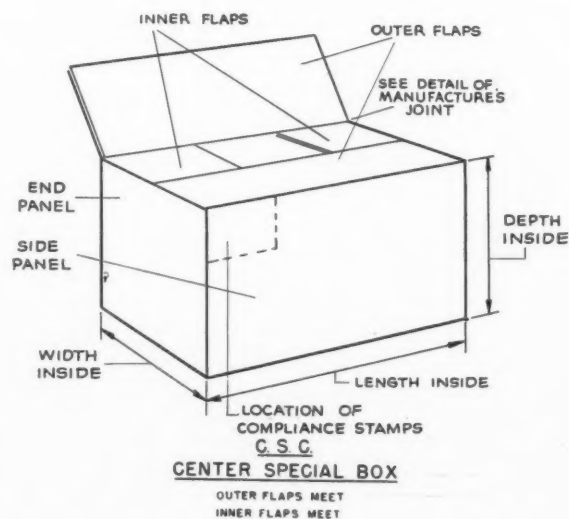
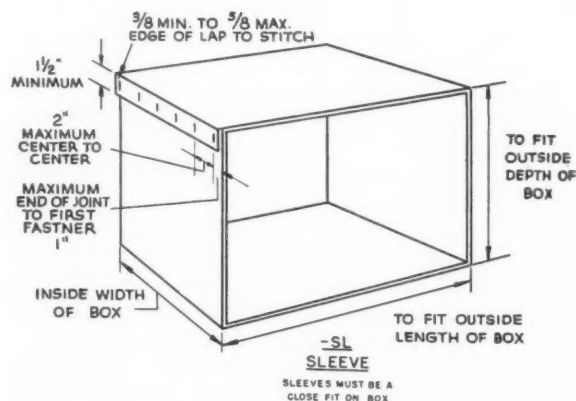
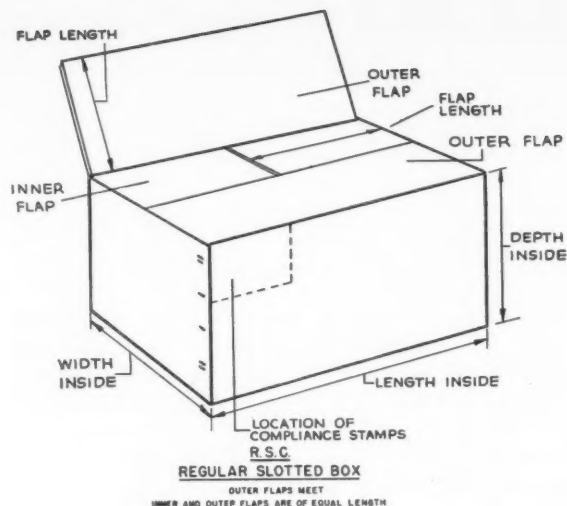
(d) The bursting strength test of fibreboard shall be made on a Mullen or Cady tester. The board shall be clamped firmly in the machine to prevent slipping. The wheel of testing machine shall be turned at a uniform speed of approximately two revolutions per second. If the board slips during a test the results shall be disregarded. In testing corrugated board double-pop tests shall be disregarded. Six pictures shall be made, three from each side of the board. To comply with the requirements of Table A, the average of the six tests shall not fall below the strength requirements. If the board fails to pass the test specified, a final retest shall be made consisting of 24 punctures, 12 from each side of the board. If the average of these tests does not fall below the strength requirements, the board complies with the bursting strength requirements.

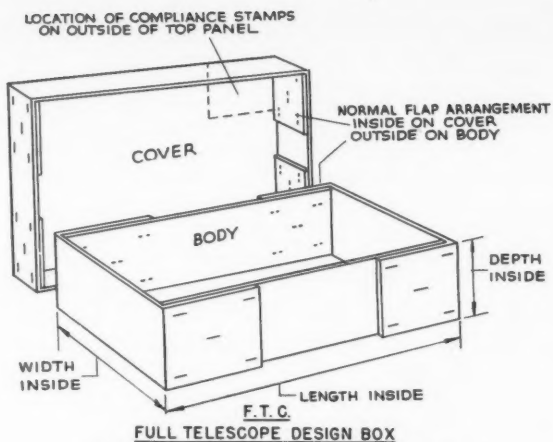
(e) *Water resistance*—Specimens 10 by 6 in., cut from sound unscored sections of boxes, shall be immersed in water at a temperature between 70° and 80° F. for 24 hrs. Immediately after removal from the water (excess water may be blotted from the surface), the specimens shall comply with the following requirements:

(1) Bursting strength test (wet) shall comply with the requirements of Table A or B, and the conditions specified in paragraph (c) (Bursting Strength Test—Dry). The tests shall be made at least 2 in. from the edge of the sheet.

(2) The component plies of the board shall not separate beyond a distance of 1/4 in. from the edges of the sheet.

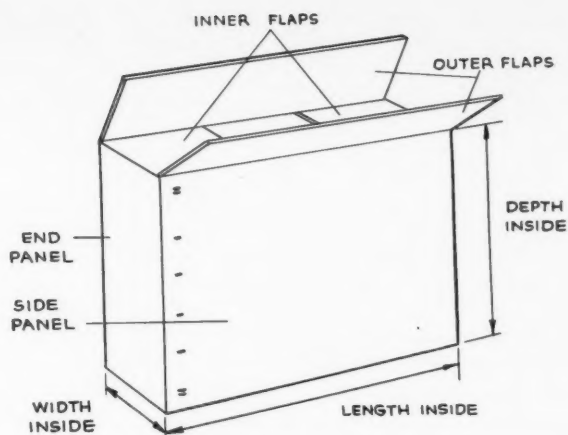
(f) *Body joint*—The body joint (manufacturer's joint No. 8) formed by overlapping the fibreboard not less than 1 1/2 in. and securing with metal fasteners. The fasteners shall be spaced not more than 2 in. apart and the distance between the outer fasteners and the end of the joint shall not exceed 1 in. An additional fastener (tie stitch) shall be used about 1/2 in. from outer fasteners at each end of the joint. In lieu of the tie-stitched joint, boxes may be stitched with the same number of fasteners (including tie stitches) equally spaced in one row. Not less than four metal fasteners shall be used in making a body joint.





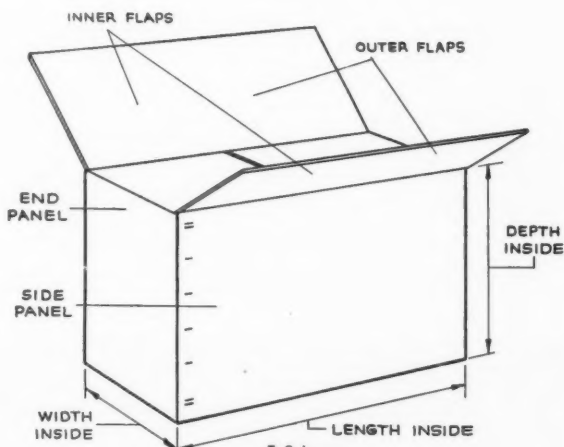
F.T.C.
FULL TELESCOPE DESIGN BOX

UNLESS OTHERWISE SPECIFIED, COVER DEPTH SHALL EQUAL OVER-ALL OUTSIDE HEIGHT OF BODY AND BODY SLOTTING SHALL BE AT RIGHT ANGLES TO COVER SLOTTING.



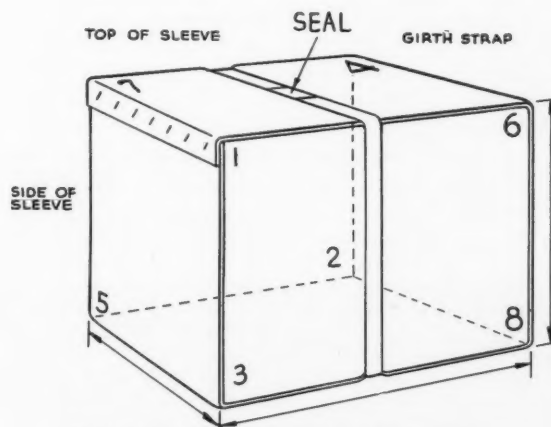
S.F.F.
SPECIAL FULL FLAP SLOTTED BOX

OUTER FLAPS FULL OVERLAP
INNER FLAPS MEET IN CENTER



F.O.L.
FULL OVERLAP BOX

OUTER FLAPS FULL OVERLAP.
INNER FLAPS SAME LENGTH AS OUTER FLAPS AND RELATIONSHIP WHEN CLOSED DEPENDS ON BOX PROPORTIONS.



CORNER NUMBERING FOR DROP TEST

SHOWING PROPER SEQUENCE OF CORNER DROPS

(g) *Sleeve*—The sleeve shall be made from one piece of fibreboard, of the same material as the shipping box. The joint shall be made by overlapping and stapling with metal fasteners not more than 2 in. apart and not more than 1 in. from each end of the joint. The joint shall be located so that it overlies part of one end of the box over which it is to be placed. The sleeve shall fit closely over the box, covering the top and bottom flaps and both ends. The length of the sleeve (length of the stapled joint) shall be the same as the inside width of the box.

(h) *Certification*—Each box shall be imprinted with the following information which shall occupy a total area not more than 36 sq. in.:

- (1) Box maker's certificate
- (2) Date of manufacture (month and year)
- (3) Certification of compliance with this specification which must be exactly as illustrated in form, size, type and wording in figure No. 9. The data is inserted for illustrative

purposes only and must conform to the facts in each case. See Table A for compliance symbols.

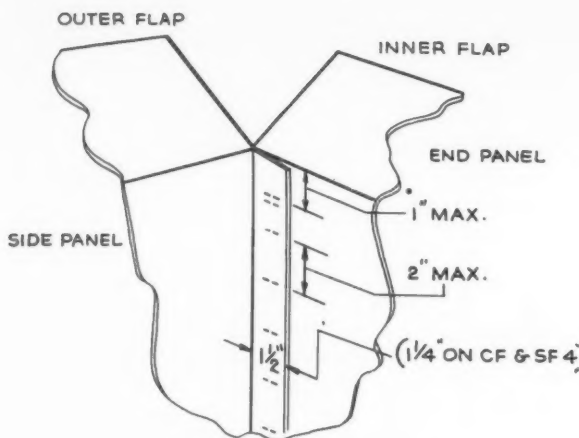
- (4) Code or identification symbols.
The above data shall be located on the boxes as follows:
Slotted style box—in a corner on one side panel.

Full telescope design box—in a corner on top panel of cover.

(i) *Closure*—The flaps on slotted-style boxes shall be sealed by applying water-resistant adhesive over the entire area of contact between the inner and outer flaps, by a sufficient number of metal fasteners, or by a combination of these methods.

(j) Full telescope-design boxes shall be sealed by applying gummed-paper tape, 4 in. wide and 90-lb. basis weight, around the entire closing edge of the box.

(k) All boxes shall be strapped to comply with the requirements of Table B.



DETAIL OF MANUFACTURER'S JOINT CONSTRUCTION
NOTE: LAP MAY BE INTEGRAL WITH END OR SIDE PANEL. STITCHES MAY BE VERTICAL, HORIZONTAL, OR DIAGONAL IN ACCORDANCE WITH STANDARD MANUFACTURING PRACTICE

Table B—Strapping requirements

Style of box	Straps applied lengthwise		Straps applied girthwise	
	Maximum distance between straps (in.)	Maximum distance from edge of box (in.)	Maximum distance between straps (in.)	Maximum distance from edge of box (in.)
RSC-SL	..	..	12	12
CSC-SL	..	..	12	12
FTC	8	8	8	8
SFF	8 ¹	8 ¹	12	12
FOL	8 ¹	8 ¹	12	12

¹ When width of box is less than 8-in., no lengthwise straps are required.

Army and Navy supplies, shipped all over the world, are protected by V-board cartons and wood boxes reinforced with steel strapping. Photo shows part of Army and Navy Exhibit at the American Management Assn. Packaging Conference, April 1943.



V BOARD GRADE — 2
TYPE — S
COMPLIES WITH SPEC.
NAVY DEPT. — 53-B-11
AND O.Q.M.G. — 93



REGULAR BOX MAKER'S CERTIFICATE

11-42 DATE MANUFACTURED

V2

LOCATION OF FIRST LETTER OF SYMBOL FOR TYPE OF BOARD WHEN A TWO LETTER SYMBOL IS REQUIRED

S

V BOARD GRADE — 2
TYPE — S
COMPLIES WITH SPEC.
O. Q. M. G. 93

LAYOUT OF COMPLIANCE STAMPS

AREA OF COMPLETE IMPRINT SHALL NOT EXCEED 36 SQ IN. IMPRINT MAY BE PLACED HORIZONTALLY ON SHALLOW BOXES. ALL TYPE SHALL BE BOLD, FACE

(1) When flat strap is used, it shall be of the formed edge type and not less than 3/8-in. wide. The thickness shall be 0.015 in. for weights not exceeding 40 lb., and not less than 0.020 in. for weights greater than 40 lb. but not exceeding 70 lb. When round wire is used the diameter shall be not less than 0.072 in. (No. 15 gauge) and the tensile strength not less than 100,000 lb. per sq. in.

Nailed Wood Shipping Boxes

THREE general types of wooden boxes and crates are utilized as shipping containers, respectively, sawn wooden boxes, plywood boxes and wirebound boxes. Although available in hundreds of sizes and weights to accommodate products ranging in size from pencil leads to bombing planes, wooden boxes made from sawn lumber are all classified under seven distinct headings known as Styles 1, 2, 2½, 3, 4, 5 and 6. The box styles are illustrated below and a brief description of each follows.

The Style 1 box, simplest of all, is adaptable to many types of products, with 60 lbs. as a reasonable weight limit. Boxes of this type consist of a single thickness of lumber made from one or more pieces of wood, with sides, top and bottom nailed to the ends. Top and bottom boards are nailed to the side grain of the ends and the side boards are nailed to the end grain of the ends.

In Styles 2, 2½ and 3, each end is strengthened with four cleats. The ends are thus reinforced against splitting and the sides are strengthened by the greater holding power of nails driven into the side grain of the vertical cleats. For gross weights of more than 200 lbs. and for large containers such as are used for textiles, these styles are commonly used.

The Style 4 box is designed to carry loads up to 200 lbs. and to withstand severe handling. The two heavy cleats at each end of the box will strengthen the ends against splitting, provide side-grain nailing for the sides and help to take the thrust if the box is dropped.

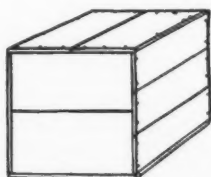
When the question of storage space makes desirable a reduction in the outside length of the package and when the shape of the contents is such as to leave space in the corners of the box, cleats are placed on the inside to form the No. 5 box. These cleats may be either square or triangular.

Style 6 boxes, with lock-corners, are often used when tight, rigid packages are required. Weights carried usually range from 10 to 150 lbs. Lock-corner boxes are of particular value for products that are subject to sifting or where maximum rigidity is required.

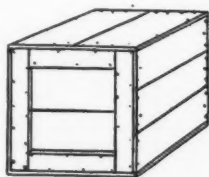
In selecting any one of the seven styles of boxes, a shipper may be influenced to some extent by the comparative initial cost, without giving due consideration to other important factors. In general, Style 3 boxes cost the most and Style 1 boxes the least. Although the difference in cost is not great, there is a big difference in the performance of the several styles of boxes.

The distance the box must travel and the transportation facilities to be used, will appreciably affect the design, as will the use of reinforcing metal straps or wire. Although there is an impression among shippers that lighter containers may be used for carload shipments, it should be remembered that, except in rare instances, every container may move in less-than-carload traffic.

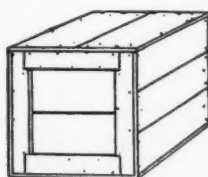
Boxes rigidly constructed from sawn lumber, in itself tough and hard, offer a high degree of protection against cutting, puncturing and abrasion. Wooden boxes may



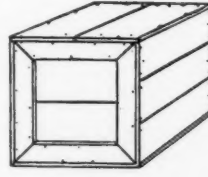
Style 1



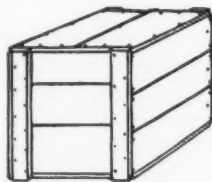
Style 2



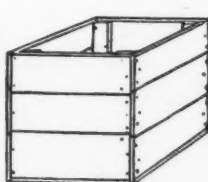
Style 2½



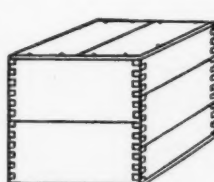
Style 3



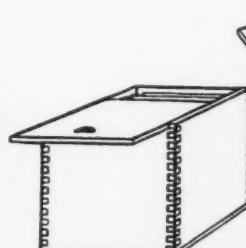
Style 4



Style 5



Style 6



Style 7



Style 8

Style 1: Nailed wooden box; uncleated ends, sides held by end grain nailing. **Style 2:** Nailed wooden box; double cleated ends eliminate weaknesses found in Styles 1, 4, and 5. **Styles 2½ and 3:** Variations of Style 2 box. **Style 4:** Nailed wooden box; outside cleats. **Style 5:** Nailed wooden box which has inside cleats. **Style 6:** Lock-corner box with the cover and bottom held in place by nailing. **Styles 7 and 8:** These are variations of Style 6 box.

be stacked without special braces and cars or trucks may be completely filled. Warehouse charges, usually figured on the basis of floor space occupied, can frequently be cut by high piling, without damage to containers.

Wooden boxes provide a difficult barrier for sneak thieves and offer protection against rodent attack. Not being affected readily by moisture or humidity changes, wooden boxes, when properly packed, often protect their contents from rain or snow for considerable periods.

Plywood boxes

The thickness of material does not alone determine strength. Plywood is an improvement upon nature—made by the gluing together and crossing of the grains of two or more pieces of thin wood, called veneer. Plywood, weight for weight, is stronger than other materials and this light, strong material is reinforced with sawn lumber cleats in a number of ways to produce the standard styles illustrated. For many uses, special styles are needed and these are scientifically designed to meet conditions. Each commodity presents a separate problem, so that various thicknesses of plywood and sizes of cleats are used. Often, unless shipping experience is available, laboratory or other tests to determine correct construction are necessary.

Plywood box parts are all one-piece, this being one of the factors accounting for the great strength, the light weight and the protection against dirt and pilferage, making assembly of the shooks very simple and economical and insuring that all shooks received can be assembled without loss.

For many commodities, internal bracing is necessary and the one-piece construction of plywood boxes is such

as to add strength to this bracing and often makes possible a simplification not attainable where like rigidity is not supplied.

Thickness of plywood used varies from $\frac{3}{24}$ in. to $\frac{5}{16}$ in. in 3-ply and, for very heavy or export work, 5-ply as thick as $\frac{1}{2}$ in. is at times used. The cleats most generally used are $1\frac{1}{2}$ in., 2 in. and $2\frac{1}{2}$ in. in width and $\frac{5}{8}$ in. or $\frac{13}{16}$ in. in thickness.

Sizes range from those made to carry very small articles to those 200 in. or more in length, many of which carry extraordinary weights.

Crating

Crates are frequently used for the transportation of a wide number of articles. For many uses, special styles are needed and these are scientifically designed to meet conditions. Each commodity to be shipped presents a separate problem.

In all instances, however, the crate must be big enough to entirely enclose the article or articles and no parts must protrude. Also a space of at least one inch must be provided between all finished surfaces and the inside of the crate. The merchandise packed within must be blocked, braced or fastened so that it cannot move around inside the crate.

Selection of lumber, nails and type of construction will depend largely upon the merchandise to be crated, whether or not the product is to be stored for some length of time, whether it is to move to a hot, humid destination from a cold, dry temperature or vice versa and whether it is going to move by water as well as by rail.

The Freight Container Bureau, 30 Vesey St., New York, has issued Bulletin 6 on the essentials of crating.

Army-Navy Specifications for Nailed Wood Shipping Boxes*

THE general nailed wood box specifications which are used by the war agencies have been little changed from those first established at shortly after our entry into the war. Practically no complaints or criticisms regarding the performance of nailed wood boxes made in accordance with these specifications have come to the War Production Board.

General

Nailed wood boxes are used in shipping articles covering a wide range of sizes and weights. The designs of wood boxes in this General Specification do not provide for weight of contents in excess of 1,000 pounds. Weights greater than 1,000 pounds are permitted only with the approval of the procurement officer. If the article to be packed must be mounted on skids, it should be packed in a nailed wood shipping crate. (See Chapter IV*.)

Each nailed wood box, before being packed, shall be lined with waterproof paper or with a waterproof bag liner. (See par. 38 j, k, and Chapter XXV*.)

* Table numbers and chapter citations refer to the complete specification as published by the Government. Certain important tables are reproduced here.

Application

(a) These specifications apply to nailed boxes for overseas shipment of war material and supplies. The same designs of boxes may be used for domestic shipment.

(b) Any of the styles of nailed boxes listed below may be used as outer shipping containers in accordance with the following weight limitations:

Styles 2, $2\frac{1}{2}$ and 3 boxes may be used for any weight of contents not exceeding 1,000 pounds, except with approval of the procurement officer.

Styles 4 and 5 boxes shall be used for weight of contents not exceeding 400 pounds.

Materials

(a) Any species of wood listed in Table 3, page 8 may be used for nailed wood shipping boxes.

(b) *Wood*—When any species of wood is specified, any one or more species in the same group may be used at the option of the contractor.

(c) All pieces shall be made of well-seasoned lumber, i.e., lumber having a moisture content not exceeding 18 per cent of the oven-dry weight. The pieces shall show no knots or other defects that materially weaken them, expose the contents of the box to damage, or interfere with the prescribed nailing. No knot shall have a diameter exceeding one-third of the width of the piece.

The outside surface of the box shall be sufficiently smooth to permit legible marking.

Nails—Cement-coated nails of the dimensions given in Table 4* shall be used in the assembly and closure of nailed wood boxes. Uncoated nails may be used in nailing cleats to ends when they pass through both the cleats and the ends and are clinched.

Table 13—Determination of Thickness of Ends, Tops and Bottoms, and Thickness and Width of Cleat
Styles 2, 2 1/2 4 and 5 Boxes
Types 1 and 2 Load—Average (Note 1)

Weight of Contents (pounds)	Style of Box	Groups I and II Woods			Groups III and IV Woods			
		Minimum Thickness of Sides, Tops and Bottoms (inches)	Size of Nails for Nailing Sides, Tops and Bottoms to Ends Groups I and II (penny)	Minimum Thickness of Ends and Thickness and Width of Cleats (inches)	Minimum Thickness of Sides, Tops and Bottoms (inches)	Size of Nails for Nailing Sides, Tops and Bottoms to Ends		Minimum Thickness of Ends and Thickness and Width of Cleats (inches)
						Group III penny	Group IV penny	
to 50	4 or 5	$\frac{3}{8}$	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	$\frac{5}{16}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats
51 to 100	4 or 5	$\frac{7}{16}$	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats	$\frac{3}{8}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats
101 to 250	4 or 5	$\frac{9}{16}$	6	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats	$\frac{1}{2}$	5	5	$\frac{11}{16}$ Ends with $\frac{11}{16} \times 2\frac{1}{4}$ Cleats
251 to 400	4 or 5	$\frac{11}{16}$	7	$\frac{25}{32}$ Ends with $\frac{25}{32} \times 2\frac{5}{8}$ Cleats	$\frac{9}{16}$	6	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats
401 to 600	2 or 2 $\frac{1}{2}$	$\frac{25}{32}$	8	$\frac{25}{32}$ Ends with $\frac{25}{32} \times 2\frac{5}{8}$ Cleats	$\frac{5}{8}$	6	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats

NOTE 1: See Appendix, pages 166 and 170 for explanation of these types of load.*

GENERAL NOTE: The thicknesses indicated above are minimum except for variation tolerance and allowance for surfacing as indicated on page 37.* When Style 3 boxes are desired, the same thicknesses shall be used as are required for Styles 2 and 2 1/2 boxes. For weight of contents of 600 to 1,000 pounds, use Table 14.

Table 14—Determination of Thickness of Ends, Tops and Bottoms, and Thickness and width of Cleats
Styles 2, 2 1/2 and 5 Boxes
Type 3. Load—Difficult (Note 1)

Weight of Contents (pounds)	Style of Box	Groups I and II Woods			Groups III and IV Woods				
		Minimum Thickness of Sides, Tops and Bottoms (inches)	Size of Nails for Nailing Sides, Tops and Bottoms to Ends Groups I and II (penny)	Minimum Thickness of Ends and Thickness and Width of Cleats (inches)	Minimum Thickness of Sides, Tops and Bottoms (inches)	Size of Nails for Nailing Sides, Tops and Bottoms to Ends		Minimum Thickness of Ends and Thickness and Width of Cleats (inches)	
						Group III penny	Group IV penny		
to 50	4 or 5	$\frac{7}{16}$	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	$\frac{3}{8}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	
51 to 100	2 or $2\frac{1}{2}$	$\frac{7}{16}$	5	$\frac{5}{8}$ Ends with $\frac{3}{4} \times 1\frac{3}{4}$ Cleats	$\frac{3}{8}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	
	4 or 5	$\frac{1}{2}$	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats	$\frac{7}{16}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	
101 to 250	2 or $2\frac{1}{2}$	$\frac{1}{2}$	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 2\frac{1}{4}$ Cleats	$\frac{7}{16}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	
	4 or 5	$\frac{5}{8}$	5	$\frac{25}{32}$ Ends with $\frac{25}{32} \times 2\frac{5}{8}$ Cleats	$\frac{5}{8}$	5	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats	
251 to 400	2 or $2\frac{1}{2}$	$\frac{5}{8}$	6	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{1}{4}$ Cleats	$\frac{1}{2}$	5	5	$\frac{5}{8}$ Ends with $\frac{5}{8} \times 1\frac{3}{4}$ Cleats	
	4 or 5	$\frac{3}{4}$	8	$1\frac{1}{16}$ Ends with $1\frac{1}{16} \times 3\frac{1}{4}$ Cleats	$\frac{5}{8}$	6	5	$\frac{13}{16}$ Ends with $\frac{13}{16} \times 2\frac{3}{4}$ Cleats	
	2 or $2\frac{1}{2}$	$\frac{3}{4}$	8	$\frac{3}{4}$ Ends with $1\frac{1}{16} \times 3\frac{1}{4}$ Cleats	$\frac{5}{8}$	6	5	$\frac{3}{4}$ Ends with $\frac{3}{4} \times 2\frac{3}{4}$ Cleats	
401 to 600	2 or $2\frac{1}{2}$	$\frac{25}{32}$	8	$\frac{25}{32}$ Ends with $1\frac{1}{16} \times 3\frac{1}{4}$ Cleats	$\frac{11}{16}$	7	6	$\frac{13}{16}$ Ends with $\frac{13}{16} \times 2\frac{3}{4}$ Cleats	
601 to 800	2 or $2\frac{1}{2}$	$\frac{13}{16}$	9	$1\frac{1}{16}$ Ends with $1\frac{1}{16} \times 3\frac{1}{4}$ Cleats	$\frac{3}{4}$	8	7	$\frac{13}{16}$ Ends with $\frac{13}{16} \times 2\frac{3}{4}$ Cleats	
801 to 1000	2 or $2\frac{1}{2}$	$1\frac{1}{16}$	12	$1\frac{5}{16}$ Ends with $1\frac{5}{16} \times 4\frac{1}{8}$ Cleats	$\frac{7}{8}$	9	8	$1\frac{1}{16}$ Ends with $1\frac{1}{16} \times 3\frac{3}{8}$ Cleats	

NOTE 1: See Appendix, pages 166 and 170 for explanation of this type of load.*

GENERAL NOTE: The thicknesses indicated above are minimum except for variation tolerance and allowance for surfacing as indicated on page 37.* When style 3 boxes are desired, the same thicknesses shall be used as are required for Styles 2 and 2 1/2 boxes.

Construction

Thickness of parts (sides, ends, top, bottom and cleats).—The minimum thickness of the ends, sides, top and bottom and the minimum thickness and width of cleats shall be determined from Table 13 for Types 1 and 2 loads (average), and from Table 14 for Type 3 load (difficult). See Appendix, pages 135 and 136, for description of types of load.

A combination of different groups, or species of woods in the same group, may be used in the same box for ends and cleats, and for sides, top and bottom. When such combinations are used, the minimum thicknesses specified in Table 13 and 14 shall be maintained.

For boxes less than 5 inches in depth, Style 1 box may be used, providing the thickness of the ends equals the combined thickness of the end and cleat indicated in Tables 13 or 14. On such boxes each side and end shall be made from one piece.

The number of pieces in any part (i.e., side, top, bottom or end) shall not exceed the number indicated in Table 15.

Table 15—Number of Pieces in Any Part of Box

Width of Box Part (inches)	Maximum Number of Pieces
Under 4.....	1
4 to 7.....	2
7 to 10.....	3
10 and over.....	Note 1

NOTE 1—One piece for each three inches of width. No piece shall be less than 2 1/2 ins. in width.

Two or more pieces that are Linderman-jointed and glued shall be considered one piece. Pieces that are Linderman-jointed have one

piece which has a projection that extends into a corresponding recess in the other piece, the projection and the recess extending the length of the pieces.

Linderman-jointed pieces differ from tongue and grooved pieces in that a cross section of the joint is a dove-tail; i.e., the outer edge of the projection is thicker than the inner edge. Linderman-jointed pieces are assembled by sliding the projection longitudinally into the recess from the end.

(c) Two or more pieces $\frac{3}{8}$ -in. or more in thickness and not less than $1\frac{1}{2}$ ins. in width at either end, which are either butt-jointed or matched and which are fastened with corrugated fasteners, shall be considered one piece. Fasteners shall be spaced not more than 8 ins. apart.

The sizes of fasteners required are shown in Table 16.

Table 16—Size of Corrugated Fasteners for Boards

Thickness of Box Part (inches)	Size of Corrugated Fasteners (inches)
$\frac{3}{8}$ to $\frac{7}{16}$	$\frac{1}{4} \times 1$
$\frac{7}{16}$ to $\frac{31}{64}$	$\frac{3}{8} \times 1$
$\frac{31}{64}$ to $\frac{51}{64}$	$\frac{1}{2} \times 1$
$\frac{51}{64}$ to $\frac{65}{64}$	$\frac{5}{8} \times 1$
$\frac{65}{64}$ and up.....	$\frac{3}{4} \times 1$

(f) If three or more corrugated fasteners are required in a joint, they shall be driven alternately from opposite sides of the part, unless the joint is tongued-and-grooved and glued in which case the fasteners may be driven from one side.

(g) The wooden parts shall average not less than the required thickness. Occasional variations in thickness due to mismanufacture will be permitted in not more than 10 per cent of the pieces but no part of any piece shall be less than seven-eighths of the required thickness.

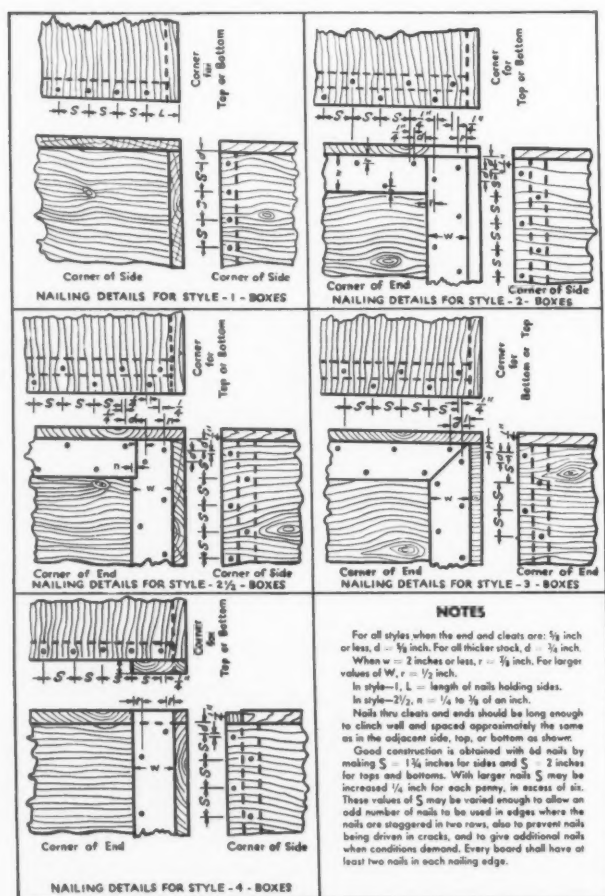


Fig. 23—Nailing chart for nailed wood boxes.

(h) If boards $\frac{3}{8}$ in. or more in thickness are surfaced on both sides (to protect the contents), the thickness may be $\frac{1}{32}$ in. less than the thickness as determined from Tables 13 and 14.

(i) *Length of Cleats*—Styles 2 and $2\frac{1}{2}$ (Fig. 22)—The ends of the cleats which are positioned across the grain of the end boards shall be one-sixteenth inch from the inside surface of the top and bottom. The sides, top and bottom shall extend over the cleats.

(j) *Style 4* (Fig. 22)—The cleats shall be positioned across the grain of the end boards and shall extend within $\frac{1}{8}$ in. of the outside surface of the top and bottom. Only the sides shall extend over the cleats.

(k) *Style 5* (Fig. 22)—The cleats may be either triangular or rectangular in section. The cross-sectional area of triangular cleats shall be not less than the cross-sectional area of the required rectangular cleats.

(l) The cleats shall be positioned across the grain of the end boards and shall extend within $\frac{1}{8}$ in. of the inside surface of the top and bottom. The sides shall extend over the ends and be flush with the outside face of the ends.

(m) Additional cleats or battens—Additional cleats or battens, of the same size as on the ends of the box, shall be applied to sides, tops or bottoms when the unsupported span exceeds that given in Table 17 for the thickness of the part involved:

Table 17—Requirements for Additional Cleats or Battens

Thickness of End, Side, Top or Bottom (inches)		Length of Unsupported Span (inches)
Group I or II Woods	Group III or IV Woods	
$\frac{3}{8}$ and $\frac{7}{16}$	$\frac{5}{16}$ and $\frac{3}{4}$	23
$\frac{1}{2}$	$\frac{7}{16}$	30
$\frac{5}{8}$	$\frac{1}{2}$	38
$\frac{3}{4}$	$\frac{5}{8}$	45
$\frac{25}{32}$	$\frac{11}{16}$	47
$\frac{13}{16}$	$\frac{3}{4}$	50
$1\frac{1}{16}$	$\frac{7}{8}$	64

(n) Additional cleats applied to ends shall run across the grain of the end boards and be placed intermediate between the regular cleats. Battens applied to sides, tops or bottoms shall run across the grain in the part to which they are applied and shall be placed inside the box whenever the nature of the contents will permit. When battens are required and are placed on the outside of the box, not less than two rows shall be attached to the outer faces.

(o) *Size of Nails*—Nails for fastening box parts together shall be cement-coated cooler, sinker or box nails.

The size of nails for fastening sides, top and bottom to ends, as determined by the species of wood and the thickness of the parts fastened together, shall agree with the requirements of Tables 13 and 14, pages 35 and 36.*

The size of nails driven through sides into the top and bottom of the box shall meet the requirements of Table 18.

Table 18—Size of Nails for Fastening Top and Bottom to Sides

Thickness of Side (inches)	Size of Nails		
	Group I Wood (penny)	Group II Wood (penny)	Group III and IV Woods (penny)
Under $\frac{1}{2}$	None	None	None
$\frac{1}{2}$ to $\frac{31}{64}$	6	5	4
$\frac{31}{64}$ to $\frac{7}{8}$	7	5	5
$\frac{7}{8}$ to $1\frac{1}{16}$	8	7	...

NOTE: For standard size of nails see Table 4, page 10.*

(p) The average spacing of cement-coated nails holding the sides, top, or bottom to the ends, and cleats shall be not greater than the values given in the following table. The distance between any two adjacent nails shall not exceed one and one-half times the spacing given in Table 19. See Fig. 23 for detailed method of spacing nails.

Table 19—Spacing of Nails
(Except for nailing top and bottom to sides)

Size of Nails	Spacing When Driven into Side Grain of End (inches)	Spacing When Driven into End Grain of End (inches)
Sixpenny or smaller	2	1 ³ / ₄
Sevenpenny	2 ¹ / ₄	2
Eightpenny	2 ¹ / ₂	2 ¹ / ₄
Ninepenny	2 ³ / ₄	2 ¹ / ₂
Tenpenny	3	2 ³ / ₄
Twelvepenny	3 ¹ / ₂	3
Sixteenpenny	4	3 ¹ / ₂
Twenty penny	4 ¹ / ₂	4

(q) To determine the number of nails to drive, divide the width of the part by the required spacing. Example: Ten-inch width divided by 1.75 equals 5.7; use six nails spaced not more than 1³/₄ ins. apart.

(r) If the desired nail is not available use one size smaller and space nails 1/4 in. closer than is required for the size of nail substituted.

(s) Each board in the side, top, or bottom shall have at least two nails at each nailing end, except that boards less than 2¹/₂ ins. in width which are Linderman-jointed or either butt-jointed or matched and are fastened with corrugated fasteners may have only one nail.

Approximately one-half of the nails in the ends of the sides, top and bottom shall be driven into the ends and the remainder into the cleats.

If the sides are less than 1/2 in. in thickness, neither the top nor the bottom shall be nailed to the sides.

When the top and bottom are nailed to the sides, the nails shall be spaced between 6 and 8 ins.

Nail spacing for cleats—Each piece of the end shall be nailed to each cleat with not less than two nails, except that boards less than 2¹/₂ ins. in width which are Linderman-jointed, butt-jointed or matched and fastened with corrugated fasteners may have only one nail.

The nails shall pass through both the cleat and the end and be clinched not less than 1/8 in. Either cement-coated or uncoated nails may be used.

The nails in each cleat shall be driven in two rows spaced as given in Table 19.

Fabrication—All parts of the box shall be cut to size, and the box shall be fabricated in accordance with good commercial practice.

Nails shall be driven so that neither the head nor the point will project above the surface of the wood. Occasional overdriving of nails will be permitted, but no nail shall be overdriven more than one-eighth the thickness of the piece.

Army-Navy Specifications for Wirebound Boxes

THESE specifications for wirebound boxes limit the weight of contents to 500 lbs. For weights in excess of 500 lbs. wirebound boxes may be used, but such specifications shall be approved by the chief of the war procurement agency involved.

Each wirebound box, before being packed, shall be lined with waterproof paper or with a water-proof liner. (See par. 88 j, k and Chapter XXV.)

Application

These specifications apply to wirebound boxes for overseas shipment of war material and supplies. The same designs of boxes may be used for domestic shipment.

Styles

This specification covers the four styles of wirebound boxes shown in Fig. 24. Any or all styles may be specified in invitation for bids.

Note: When contents do not give adequate inside support to the end on Style 3 box, the box shall be assembled with the end wires on the inside of the box.

* The wirebound box specifications which are given herewith are those used by the armed forces and Lend-Lease. Properly used, these containers have done their part well in shipping great quantities of war supplies to all parts of the world.

Materials and workmanship

Each part of the box shall be the correct size and the workmanship shall be in accordance with the quality standards of the wirebound box industry.

Wood—The principal woods used for wirebound boxes are classified in Table 3. When any species of wood is specified, any species in that same group of woods may be used at the option of the contractor. Nothing in this specification shall prohibit the contractor from using a denser species of wood for any part of the box.

Each piece of wood shall be free from decay. Each cleat and batten shall be free from visible splits.

In cleats, battens and liners, the divergence of the grain shall not exceed one inch in 10 inches of length. In sawed or veneer boards, the divergence of the grain shall not exceed one inch in eight inches of length.

Knots—Knots, if any, shall be sound. In sawed, or veneer boards the diameter of any knot shall not exceed 1¹/₂ ins. nor exceed one-third the width of the board. No part of a knot may be closer to the end of the board than one inch.

In cleats and battens the cross-sectional area of any knot shall not exceed one-fourth the cross-sectional area of the piece. No part of any knot may be closer to the end of the cleat or batten than 1¹/₄ ins.

Seasoning—The moisture content of sawed boards shall not be less than nine per cent nor exceed 18 per cent of its dry weight at the time of manufacture of boxes. Likewise, for veneer, the moisture content shall not be less than nine per cent nor exceed 15 per cent.

Table 22—Thickness of Sawed and Veneer and Plywood Boards for Wirebound Boxes

Weight of Contents (lbs.)	Group I Woods (See Note)			Group II and III Woods			Group IV Woods		
	Type 1 load (easy)	Type 2 load (av.)	Type 3 load (dif.)	Type 1 load (easy)	Type 2 load (av.)	Type 3 load (dif.)	Type 1 load (easy)	Type 2 load (av.)	Type 3 load (dif.)
Up to 42	7/32	1/4	5/16	1/2	1/8	7/32	1/8	1/2	3/16
43 to 55	7/32	1/4	5/16	1/2	3/16	7/32	1/8	1/4	3/16
56 to 85	1/4	1/4	3/8	1/2	3/16	1/4	1/7	1/4	7/32
86 to 125	5/16	5/16	3/8	3/16	7/32	1/4	1/6	3/16	7/32
126 to 200	3/8	3/8	...	7/32	1/4	5/16	3/16	7/32	1/4
201 to 300	...	...	...	1/4	5/16	5/16	7/32	1/4	5/16
301 to 400	...	...	...	5/16	5/16	3/8	1/4	5/16	3/8
401 to 500	...	...	...	3/8	3/8	...	5/16	3/8	3/8

Note: The following species of Group I of the same thickness permitted for Group II and Group III may be used for sides, top, bottom, ends and liners only: Cottonwood, Cypress, Magnolia, Noble Fir, White Fir and Spruce. Where 3/16-in. thickness is required, two pieces, each 1/8 in. thick, may be used. Where 3/8-in. thickness is required, two pieces, each 3/16 in., may be used. (See Appendix, pages 135 and 136, for description of types of load.) The width of any sawed or veneer board shall be not less than 2¹/₂ ins. at any point.

Table 23—Maximum Inside Length of Box Without Extra Rows of Cleats (To be used for Type 2, average load, only)

Thickness of Boards Required by Table (ins.)			Inside Length of Box (ins.)
Column a	Column b Groups II and III	Column c	
Group I	Group IV	Column d	
1/4	1/16 and 3/16	1/7 and 1/8	24
5/16	7/32	3/16	28
3/8	1/4	7/32	32
...	5/16	1/4	36
...	...	5/16	40
...	3/8	3/8	44

Construction

Boards—Boards may be either sawed lumber, single thickness veneer or plywood. When plywood is used, it shall conform with the requirements of Chapter 5. The thickness of sawed boards, veneer or plywood shall conform with the requirements of Table 22 for the group of wood used, for the type of load and weight of contents in the box.

Exception: No part of any sawed board, whether rough or dressed, shall be more than 1/4 in. below the thickness specified in Table 22 for boards up to 7/32 in. thick and not more than 1/32 in. below for boards 1/4 in. or more in thickness. No part of any veneer or plywood board shall be less than 95 per cent of the thickness specified in Table 22.

Cleats—Cleats shall be of Group II, Group III or Group IV woods. Group I woods shall not be used for cleats. For weight of contents exceeding 400 lbs., Group IV woods only shall be used.

Cleats shall be made with mitered ends or with mortised and tenoned ends.

Cleats shall not be less than 13/16 in. \times 13/16 in. for boxes having weight of contents not exceeding 85 lbs. For greater weight of contents, cleats shall be not less than 13/16 in. \times 7/8 in. or 3/4 in. \times 13/16 in. No part of any cleat shall be more than 1/32 in. below either dimension of the above cleat sizes.

Extra Rows of Cleats—Boxes having greater inside length than the distance indicated in column d, Table 23 (average load) and Table 24 (difficult load), must be reinforced with one or more extra rows of cleats. The distance between any adjacent rows of cleats shall not exceed the distance indicated in column d.

Table 24—Maximum Inside Length of Box Without Extra Rows of Cleats (To be used for Type 3, difficult load, only)

Thickness of Boards Required by Table (ins.)			Inside Length of Box (ins.)
Column	Column b Groups II and III	Column c	
Group I	Group IV	Column d	
5/16 and 3/8	7/32 and 1/4	3/16 and 7/32	17
...	1/4	1/4	22
...	3/8	5/16	27
...	...	3/8	32
...

If the nature of the contents makes the sum of extra rows of cleats impracticable, the box may be made without them, provided it is made from a heavier thickness of material selected from columns a, b, or c which corresponds to a length in column d equal to, or greater than, the box length.

Any of the following sizes of cleats may be used for extra rows:

2 3/4 ins. wide \times 3/8 in. (or 7/16 in.) thick
 2 1/4 ins. wide \times 1/2 in. (or 9/16 in.) thick
 1 3/4 ins. wide \times 5/8 in. (or 11/16 in.) thick
 1 1/4 ins. wide \times 3/4 in. (or 13/16 in.) thick
 1 1/8 ins. wide \times 7/8 in. thick
 3/4 in. wide \times 15/16 in. thick

Staples must be driven through all cleats 5/16 in. or less in thickness and clinched.

Example: A box is required having an inside length of 27 ins. and made of Group III wood, to carry 110 lbs. of steel castings. This is type 3 load and according to Table 22 any Group III wood 1/4 in. thick may be used. By referring to Table 24, columns b and d, it will be seen that 1/4-in. Group III wood may be used if the box has one extra row of cleats. If it is impracticable to use an extra row of cleats, they may be omitted, according to columns b and d, if 3/8-in. Group III wood is used.

Binding Wires—Binding wire shall be annealed steel and shall be galvanized when so specified.

Application—Each binding wire shall be continuous once around the girth of the box. On the wired ends of Style 3 box, each binding wire shall be continuous across the end.

Each binding wire shall be fastened by staples astride the wire and shall pass either through the veneer or sawed boards and shall be

Table 25—Number and Gauge of Girth Wires

Weight of Contents (lbs.)	Number and Gauge of Wires															
	Inside Length Up to 9 ins.		Inside Length Between 9 and 16 ins.		Inside Length Between 16 and 23 ins.		Inside Length Between 23 and 30 ins.		Inside Length Between 30 and 36 ins.		Inside Length Between 36 and 43 ins.		Inside Length Between 43 and 54 ins.		Inside Length Over 54 ins.	
	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge	No. of Wires	Gauge
Up to 85	3	15	4	15	5	15	5	15	6	15	7	15	8	15	9	15
86 to 125	3	14	4	14	5	14	5	14	2 14	14	2 14	14	2 14	14	2 14	14
126 to 200	3	13	4	13	5	14	2 13	13	4 15	15	5 15	15	6 15	15	7 15	15
201 to 300	...	...	4	13	5	13	3 13	13	2 13	13	2 13	13	2 13	13	2 13	13
301 to 400	...	...	...	...	6 13	13	6 13	13	4 14	14	5 14	14	6 14	14	7 14	14
401 to 500	...	...	...	...	(See note)	...	7 13	13	7 13	13	8 13	13	8 13	13	9 13	13
							(See note)									

Note: If limitations in manufacture prevent the use of the number of girth wires specified, one less wire may be used, but the next larger diameter shall be required.

15 gauge is 0.072 in. diameter
 14 gauge is 0.080 in. diameter
 13 gauge is 0.0915 in. diameter
 12 gauge is 0.1055 in. diameter

When two gauges of girth wires are specified, the larger wires shall be stapled over the outer rows of cleats.

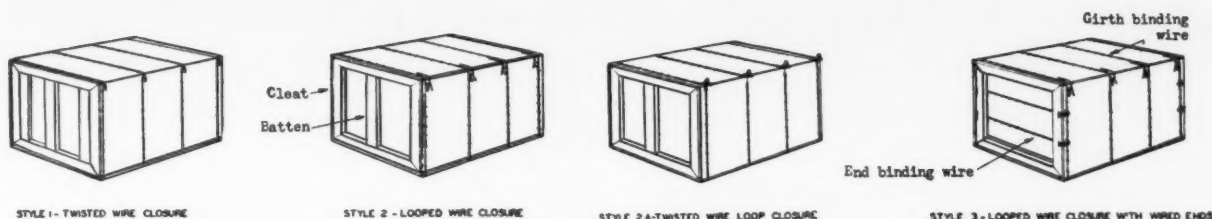


FIGURE 24.—Styles and closures of wire-bound wood boxes.

clined or shall pass through the boards and into the cleats. The points of the staples shall not protrude from the surface of the wood, but if driven through a board or cleat, they shall be clinched.

Ends of Wires—For Style 1 box (Fig. 24), ends of girth wires shall not extend less than $2\frac{1}{4}$ ins. beyond the edge of the top boards and not less than 1 in. beyond the edges of the side boards.

For Style 2 box each end of each wire shall be a looped wire fastener by bending the wire back in the opposite direction, the ends of the wire being driven through the boards and clinched.

Style 2A box has each end of each wire formed into a loop by twisting the wires.

For Style 3 box each end of each girth wire shall be a looped wire fastener formed as described for Style 2 box. Each end of each end wire shall be a looped wire fastener which shall pass through a notch in the cleat and shall be bent back over the girth wire over the cleat against the side of the box as shown in Fig. 24.

The length of looped fasteners on girth wires on the top of the box shall be not less than $\frac{9}{16}$ in. nor more than $1\frac{1}{4}$ ins. long. On the side of the box the fasteners shall be not less than $\frac{7}{8}$ in. nor more than $1\frac{1}{4}$ ins. long. The length of looped wire fastener on end wires shall be $1\frac{1}{4}$ ins. when wires are to be on the outside of the box, and 2 ins. when the wires are on the inside of the box.

It is permissible to use any of the styles of twist or loop girth wire fasteners shown in Fig. 24 on any boxes constructed under this specification.

Number and Diameter—The girth wires shall comply with the requirements of Table 25 for the weight of contents indicated.

The end wires on Style 3 box shall comply with Table 26.

Table 26—Number and Gauge of End Wires on Style 3 Box

Inside Depth of Box (ins.)	Number of Wires		
	Type 1 load	Type 2 load	Type 3 load
Up to 10	1	1	1
10 to 16	2	2	2 (Note 1)
16 to 23	3 (Note 2)	3 (Note 2)	3 (Note 2) (Note 3)
23 and over	4 (Note 2)	4 (Note 2)	4 (Note 2) (Note 3)

Weight of Contents (lbs.)	Gauge of Wires	
Up to 125	15	
126 to 300	14	
301 to 500	13	

Note 1. When two liners, one $1\frac{1}{8}$ ins. wide, and one 3 ins. wide, are required by Table 28, only one wire need be used on the ends of boxes less than $11\frac{1}{2}$ ins. deep. When two 3-in. liners are required by this same table, only one wire need be used on the ends of boxes less than $13\frac{1}{2}$ ins. deep.

Note 2: For any box, when three end wires are required by the table above, a 3-in. liner may be substituted for the center binding wire. When four end wires are required, two liners 3 ins. wide may be substituted for the two intermediate wires.

Note 3: For boxes more than 16 ins. wide and 16 ins. deep and containing more than 125 lbs., or for any box more than 16 ins. deep and containing more than 250 lbs., two end wires only are required in addition to the liners specified in Table 28.

Unless otherwise specified, all girth wires shall be uniformly spaced. Binding wires on ends of Style 3 box shall be located not more than $4\frac{1}{4}$ ins. from each cleat parallel to the end wires. When more than two end wires are used the intermediate wires shall be spaced at approximately uniform intervals.

Staples—Stapling wire shall be steel wire and shall be galvanized when so specified.

Staples driven over binding wires into cleats shall be not less than 0.0625 in. diameter (No. 16 gauge). For $\frac{13}{16}$ -in. \times $\frac{13}{16}$ -in. cleats, staples shall be $\frac{7}{8}$ in. long for $\frac{1}{8}$ -in. thick boards, and 1 in. long for boards more than $\frac{1}{8}$ in. thick. For $\frac{13}{16}$ -in. \times $\frac{7}{8}$ -in. cleats, staples shall be 1 in. long for boards $\frac{1}{2}$ in. thick, $1\frac{1}{8}$ in. long for boards not less than $\frac{1}{8}$ in. nor more than $\frac{1}{4}$ in. thick, and $1\frac{1}{4}$ ins. long for boards more than $\frac{1}{4}$ in. thick. For cleats made from Group IV woods, the length of staples shall not be more than $1\frac{1}{8}$ ins.

(Exception: Staples long enough to provide a satisfactory clinch shall be used for attaching extra rows of cleats $\frac{9}{16}$ in. or less in thickness).

Staples driven over binding wires into boards only shall be not less than 0.0475 in. diameter (No. 18 gauge). For boards not more than $\frac{3}{16}$ in. thick, the length of staples shall be not less than $\frac{3}{8}$ in. thick. For boards $\frac{7}{32}$ in. thick and over, the length of staples shall be not less than $\frac{1}{2}$ in.

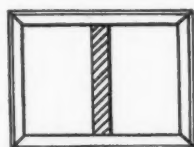
(x) Staples on the box blank shall be driven at intervals of $1\frac{1}{2}$ ins. except where the requirements for positioning end wires or the length of the cleat require a greater interval. These intervals shall not exceed $2\frac{1}{2}$ ins. The minimum number of staples in any cleat shall comply with the requirements of Table 27. Not less than two staples shall be driven over each girth wire through each board.

Table 27—Minimum Number of Staples Required in Any Cleat

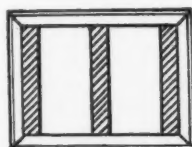
Weight of Contents in Box (lbs.)	Minimum Number of Staples
Up to 85	3
86 to 125	4
126 to 200	5
201 to 300	7
301 to 400	9
401 to 500	11

Note: If the shape of the box cannot be changed to permit the minimum number of staples required by the above table, a cleat not less than $1\frac{1}{2}$ ins. wide may be used with staples driven in two parallel rows not less than $\frac{3}{4}$ in. apart. One row of staples shall be driven over the binding wire. A row of nails, driven through the boards and cleats and clinched, may be substituted for the second row of staples. The total number of staples, or staples and nails, in any cleat shall be at least 33 per cent more than required by the table.

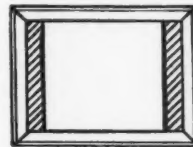
At each corner of the box the distance from the end of the cleat to the nearest staple shall not exceed $1\frac{1}{8}$ ins.



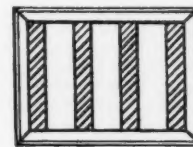
A Battsens



F Battsens



D Battsens



X Battsens

FIGURE 25.—Arrangement of battsens on wire-bound boxes.

Table 28—Number and Width of Liners for Style 3 Box

Weight of Contents in Box (lbs.)	Width of End (ins.)	Depth of End (ins.)	Minimum Number	Minimum Width (ins.)
Up to 125 125 to 250	Any width	Any depth	2	1 1/8
	Less than 16	Any depth	2	1 1/8
	Over 16	Up to 9	2	1 1/8
	Over 16	9 1/8 to 13	1 and 1	3 1/8
	Over 16	13 1/8 to 17	2	3
	Over 16	17 1/8 to 28	3	3
	Over 16	Over 28	4	3
	Any width	Up to 9	2	1 1/8
	Any width	9 1/8 to 13	1 and 1	3 1/8
	Any width	13 1/8 to 17	2	3
Over 250	Any width	17 1/8 to 28	3	3
	Any width	Over 28	4	3

Battens—A batten is a board used to reinforce the ends of Styles 1, 2 and 2A boxes. The batten is applied to the outside face of the end, with its grain at right angles to the grain of the end. More than one batten may be used on an end.

No battens are required for boxes less than 11 ins. wide and carrying less than 125 lbs. For boxes greater than 11 ins. inside width, carrying less than 125 lbs., one or more intermediate battens parallel to the side cleats shall be used. The distance between side cleats and an intermediate batten shall not exceed 5 ins. The distance between intermediate battens shall not exceed 7 ins. For weights greater than 125 lbs. there shall be a batten adjacent to each side cleat. When the space between battens adjacent to side cleats exceeds 10 ins., one or more intermediate battens shall be used. The distance between intermediate battens and battens adjacent to side cleats or between intermediate battens shall not exceed 7 ins. Figure 25 shows various arrangements of battens meeting the requirements of these specifications.

Battens shall not be less than 1 1/4 ins. wide when made from Group II, III or IV woods, and not less than 1 3/4 ins. wide when made from Group I wood. Battens shall be at least as thick as the cleats on the box.

(cc) **Liners**—A liner is a thin board stapled to the end boards, with its grain perpendicular to the grain of the end boards.

(dd) Ends of Styles 1, 2 and 2A boxes made from veneer or sawed boards, for which no battens are required, shall have two edge liners. The liners shall not be less than 1 1/4 ins. wide. No edge liners are required if the end is made from plywood.

When plywood ends are used, the outer pieces shall be parallel to the top and bottom cleats.

(ee) There shall be two edge liners on each end of Style 3 box. The minimum requirements for number and width of liners are given in Table 28.

(ff) The thickness of all liners shall not be less than the thickness of the end boards, but need not exceed 1/4 in.

(gg) Each edge and intermediate liner shall be fastened to the end boards by staples. Each staple shall pass through the liner and the end board, and shall be clinched. Each staple shall be steel wire not less than 0.0475 in. in diameter (No. 18 gauge) and shall be long enough to provide a satisfactory clinch. Each liner 3 ins. wide shall have two rows of staples and in each row they shall not be spaced more than 3 ins. apart.

(hh) Exception to specification: Nothing in this specification shall be construed to prohibit the use of boxes of special design when, in the experience and judgment of the purchasing officer, the nature of the article or material to be packed justified such special boxes. In such cases, approval of the chief of the war agency is required. Further, nothing herein contained shall be construed as prohibiting the use of thicker material, additional or larger wires, additional or larger cleats, diagonals, longer staples, or closer spacing of staples, than specified.

Packing for Shipment—Unless otherwise ordered the boxes shall be shipped knocked down to occupy a minimum amount of space and shall be tied in bundles of not more than 10. Ends less than 1/4 in. thick for Style 3 boxes may be attached to the knocked-down box at time of manufacture. Ends 1/4 in. or thicker for Style 3 boxes shall not be attached to the box until it is assembled. When the ends are not attached to the knocked-down boxes, they shall be either tied in bundles of not more than 20 or packed in boxes. Long parts of interior packing may be bundled or may be packed in boxes. Small parts of interior packing shall be packed in boxes.

Assembling and closing boxes

Assembling the Boxes—In assembling Styles 1, 2 and 2A boxes, the end boards shall be fastened to each side cleat and each batten by either staples or cement-coated nails. Each nail or staple shall be made of steel wire. Staples shall not be less than 0.0625 in. diameter (No. 16

gauge). Nails shall be not less than 0.076 in. diameter (No. 14 1/2 gauge). The length of each fastening shall not be less than the thickness of the end boards plus three-quarters the thickness of the cleats or battens. The points of the fastenings shall not protrude from the cleats or battens, but if driven through, they shall be clinched. The average spacing of the fastenings shall not exceed 2 1/2 ins. Battens adjacent and parallel to cleats shall be fastened by driving sevenpenny nails through the boards, through the cleat and into the batten. Spacing of nails shall not exceed 5 ins. Intermediate battens only shall be fastened to the bottom cleat by driving one sevenpenny cement-coated nail through the board and cleat into the end of the batten.

Style 3 box is assembled by bending the loop wire fasteners on ends at right angles and inserting them in notches provided in the cleats. The protruding fasteners are then bent back around the girth wire over the cleat, against the side of the box.

Closing the Boxes—Style I box shall be tightly closed by bringing the top cleats in contact with the side cleats and by twisting the wires at the closing edge of the box with a wire twisting tool which will remove the projecting end of the wire. The twist shall be knocked flat against the side of the box, parallel to the binding wire. If intermediate battens are used on the ends of the box, one sevenpenny cement-coated sinker, cooler or box nail shall be driven through the board and top cleat into the end of each batten.

Styles 2 and 2A boxes are closed by bringing the top cleats in contact with the side cleats and by inserting the side loop through the top loop and bending it down and against the side of the box. If intermediate battens are used on the ends of the box, one sevenpenny cement-coated sinker, cooler or box nail shall be driven through the board and top cleat into the end of each batten. No nails shall be driven into the ends of battens adjacent to side cleats.

Style 3 box is closed by bringing the top cleats in contact with the side cleats and by inserting the side loop through the top loop and bending it down and against the side of the box.

(f) Where strapping is required, the top cleats shall be brought to contact with the side cleats and strapping applied before wires at closing edges are twisted or looped. This eliminates occasional slack which may develop when strapping is applied after closure is made.

Strapping

(a) All styles of boxes in which the contents exceeds 150 lbs. shall be reinforced with one lengthwise flat or round wire strap drawn tightly around the center of top, bottom and ends of the box. When the contents exceed 250 lbs., in addition to the lengthwise strap, two flat or round wire straps shall be located approximately 3 ins. from each end of the box around the sides, top and bottoms. Three flat or round wire straps, applied as just described, shall also be used when contents exceed 150 lbs. and the required number of staples in any cleat does not exceed the minimum (see Table 27, page 50). On boxes containing 150 lbs. or more, and having extra rows of cleats, an additional flat or round wire strap shall be applied directly over each row of cleats around the sides, top and bottom. If boxes with intermediate rows of cleats contain more than 400 lbs. but do not have an additional row of cleats located in the center of the box, an additional flat or round wire strap shall be applied in the center over sides, top and bottom of the box.

(b) On boxes containing 150 lbs. or less, reinforcing wire shall be not less than 14 gauge (0.080 in. diameter) for 100,000-lb. tensile strength wire and 15 gauge (0.072 in. diameter) for 140,000-lb. tensile strength wire. If flat strap is used, it shall be not less than 1/2 in. by 0.020 in. and shall have a minimum tensile strength of 80,000 lbs. per sq. in. and a minimum joint efficiency of 75 per cent.

(c) On boxes containing more than 150 lbs., reinforcing wire shall be not less than 13 gauge wire (0.0915 in. diameter) of 140,000-lb. tensile strength. If flat strap is used it shall not be less than 3/4 by 0.023 in. and shall have a minimum tensile strength of 80,000 lbs. per sq. in. and a minimum joint efficiency of 75 per cent.

Steel Strapping Shipments

by V. C. Hogren

BEYOND production lines of every industry are hazards from which properly applied steel strapping offers effective and economical protection. The thought, the care, the hours of effort required to produce and package a product—mean little to the customer whose merchandise reaches him in poor condition. Until some attractive business has been lost to a more enterprising competitor shippers usually do not know that claims have been filed with the carriers.

Besides its function in reinforcement, steel strapping often reduces shipping costs by permitting the use of lighter, less expensive containers. It speeds up the handling of materials by making skid-shipping practical, safe, and economical.

Strapping also permits the baling of many items—notably textiles—which conserves valuable shipping and storage space yet fully protects the commodity. The use of strapping to brace carload freight has directly lessened claims for damages, cut freight bills by reducing damage, and speeded up and simplified loading and unloading operations.

The value of reinforcing a shipping pack with steel strapping has long been recognized by the U. S. Government whose Federal Standard Stock Catalog includes strapping as an integral part of the packing specifications for a number of commodities. Specifications QQ-S-781, 42-S-11 and NN-B-621A cover strapping as required by the various branches of the Federal Government.

Types of strapping

Steel strapping is available in two types: 1) nailed and 2) nailless.

Nailed strapping, necessarily confined to wooden packages, is held in place (usually at the extreme ends of a box) with nails. Since the application of nailed strap can seldom maintain the speed required in modern shipping rooms, the use of it is diminishing except for export packs and to reinforce boxes of bottles, lugs, tote boxes, etc. Strapping to be nailed is usually annealed (soft) to facilitate nailing—although some kinds are furnished with nail holes already punched. (See Table No. 1.)

Nailless strapping, developed rapidly in recent years as improved equipment has accelerated the operation to keep pace with fast moving production lines. The strapping is first pulled tight around a package and the two ends are joined together with a metal seal. Separate hand tools (stretcher and sealer) and a one-piece, automatic device to tighten, seal, and cut the strap speedily are available for every type of shipping pack from parcel post to carload ladings.

Proper application requires that the tension on the strapping be sufficient to cut the corners or edges of the

box slightly. Straps should always be applied at right angles to the edges of the pack so that the reinforcement will sit squarely on the box.

Nailless strapping is ordinarily furnished in coils weighing from 60 to 100 lbs. each; coils of measured length and cut lengths are also available for special applications. The black painted or lacquered finish is the most widely employed although zinc coated (galvanized) is preferred by some shippers especially for export or where the packages are stored for long periods of time. (See Table No. 2.)

Wooden boxes

Based on literally thousands of tests conducted by the Forest Products Laboratory (U. S. Department of Agriculture) at Madison, Wisconsin, the thickness of lumber for the top, bottom, and sides of a nailed wooden box can be safely reduced 20 per cent to 40 per cent when the package is properly strapped. (See Table No. 3.)

Suggested sizes of steel strapping for various gross weights of packed containers are given in Table No. 4. These recommendations are not arbitrary because the nature of the product, method of handling, internal packing requirements, kind and grade of lumber used, nailing, and construction are important factors which must also be considered.

A single strap should be placed around the middle of the box. When two straps are employed, each should be one-sixth of the length of the box from the ends. With

**TABLE 1. NAILED STRAPPING:
SIZES AND WEIGHTS**

.015 IN. THICK: LIGHT AND MEDIUM WEIGHT PACKS

Width in Inches	Small Coil		Large Coil		Estimated Pounds per M Ft.
	Ft.	Lbs.	Ft.	Lbs.	
3/8	300	5.7	4000	76	19.1
1/2	300	7.6	3000	76	25.5
5/8	300	9.6	3000	96	31.8
3/4	300	11.5	2000	76	38.2
7/8	300	13.4	2000	89	44.6
1	300	15.3	1500	76	50.9

.028 IN. THICK: HEAVY AND BULKY PACKS

Width in Inches	Small Coil		Large Coil		Estimated Pounds per M Ft.
	Ft.	Lbs.	Ft.	Lbs.	
1/2	300	14.2	3000	143	47.5
5/8	300	17.8	2000	119	59.4
3/4	300	21.4	2000	143	71.3
7/8	300	25.0	1500	125	83.2
1	300	28.5	1500	143	95.1

TABLE 2. STANDARD SIZES OF NAILLESS STRAPPING

(WEIGHTS AND FOOTAGES ARE APPROXIMATE)

Width, Thickness in Inches	Ft. per Lb.	Lbs. per 1000 Ft.
$\frac{1}{4} \times .015$	78.55	12.73
$\frac{1}{4} \times .020$	58.89	16.98
$\frac{3}{8} \times .010$	78.55	12.73
$\frac{3}{8} \times .012$	65.45	15.28
$\frac{3}{8} \times .015$	52.45	19.10
$\frac{1}{2} \times .010$	58.89	16.98
$\frac{1}{2} \times .012$	49.06	20.38
$\frac{1}{2} \times .015$	39.22	25.47
$\frac{1}{2} \times .018$	32.75	30.56
$\frac{1}{2} \times .020$	29.44	33.96
$\frac{5}{8} \times .010$	47.13	21.22
$\frac{5}{8} \times .012$	39.22	25.47
$\frac{5}{8} \times .015$	31.41	31.84
$\frac{5}{8} \times .018$	26.18	38.20
$\frac{5}{8} \times .020$	23.32	42.45
$\frac{5}{8} \times .023$	20.48	48.82
$\frac{3}{4} \times .015$	26.18	38.20
$\frac{3}{4} \times .018$	21.81	45.85
$\frac{3}{4} \times .020$	19.63	50.94
$\frac{3}{4} \times .023$	17.05	58.58
$\frac{3}{4} \times .028$	14.03	71.28
$* \frac{3}{4} \times .035$	11.23	89.14
$* \frac{3}{4} \times .050$	7.85	127.34
$* 1 \frac{1}{4} \times .035$	6.73	148.58
$* 1 \frac{1}{4} \times .050$	4.77	212.24
$* 2 \times .050$	2.95	339.60

* Sizes generally used for bracing carload freight.

three straps, the outer two should be at the same distance and the third at the middle. Three or more straps are suggested for relatively long packages.

A recent popular development is the strapping of wooden containers to hold the cover in place without the use of nails. To open the package, receivers merely snip the straps. As the cover is intact, such boxes can be re-used for shipping or storage.

Wooden crates

Steel strapping is valuable to keep the several parts of a crate in position and add the strength needed to withstand abuse in transit. As is the case with wooden boxes, the thickness of the lumber in a crate can usually be safely reduced. Whenever possible the straps should be applied around the short dimensions of the crate, over the slats. As an extra precaution U-shaped staples are sometimes nailed into the cleats over the bands.

Steel strapping is also used to brace products within crates to prevent internal shifting. Cartons holding the separate parts are sometimes strapped to the bottom or sides of crates containing stoves, machinery, washers, etc.

Cartons

By providing a greater margin of safety, steel strapping often permits the use of fibre and corrugated containers for products that would otherwise have to be packed in more expensive packages.

Many items, particularly textiles, can be shipped in "overloaded" cartons at lower freight rates when steel strapping is employed. For data on specific products, shippers should consult the Consolidated Freight Classification.

Two or more cartons can be strapped into conveniently handled units, which prevents individual packages from being lost enroute. Only one shipping label is required on such a bundle.

The Express Classification requires that packages weighing less than ten pounds be charged at the rate for that weight, but if two or more such packages are strapped into a single unit for one consignee, the rate is based on the aggregate weight. For example, three 9-lb. packages shipped individually would be billed at the express rate for 10 lbs. each or a total of thirty pounds. If these same cartons were strapped into a single package for one destination, the shipper or receiver would pay on the basis of only twenty-seven pounds.



1. This machine is anchored to a wooden base. The box serves as a hood, held in place with steel bands. No nails are used to close this package.
2. Strapping cartons to crate base. Strap receptacle is overhead in this crowded plant.



3. Hand-operated tool for applying steel tape for reinforcing corrugated shipping containers. 4. Steel tape is tightened on shipping case before being fastened and clipped to proper length. 5. Consignee removes steel reinforcement by simply cutting the strap. Photos Acme Steel Co.

Internal bracing of furniture, such as novelty tables (Fig. 3, sketch 26), is easily accomplished with steel strapping. To prevent movement and consequent damage the product is firmly held to the base or top of the carton. As indicated in the sketch, the actual strapping of the container is done from the outside.

Fibre and corrugated wraps

Adequate protection to such diversified products as studio couches (Fig. 3, sketch 18), steel shelving, safes, metal bars, desks (Fig. 3, sketch 27), and mill-work is made possible with fibre or corrugated wraps held in position by steel bands. The savings in packing, in material, in time which results from this practice are obvious. The receiver also benefits as snipping the straps quickly opens the package.

No general rule as to strap sizes can be formulated for specific products as individual packing practices vary. However, the vast possibilities for reducing shipping costs with steel-strapped wraps warrants investigation by manufacturers.

TABLE 3. PERMISSIBLE REDUCTIONS IN LUMBER THICKNESS

Thickness of Sides, Top and Bottom of Wooden Shipping Containers, in Inches

Unstrapped	Strapped	
	One Strap	Two or More Straps
$\frac{7}{8}$	$\frac{5}{8}$	$\frac{1}{2}$
$1\frac{1}{16}$	$\frac{5}{8}$	$\frac{1}{2}$
$\frac{5}{8}$	$\frac{1}{2}$	$\frac{3}{8}$
$\frac{3}{16}$	$\frac{1}{16}$	$\frac{3}{16}$
$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{16}$
$\frac{1}{16}$	$\frac{5}{16}$	$\frac{1}{4}$
$\frac{3}{8}$	$\frac{5}{16}$	$\frac{1}{4}$

(Data from Bulletin No. 14: Domestic Commerce Series; United States Department of Commerce.)



TABLE 4. SIZES OF STEEL STRAPPING FOR WOODEN BOXES OF VARIOUS GROSS WEIGHTS

Gross Weight of Box in Pounds	Dimensions of Strapping in Inches, when Different Number of Straps Are Used		
	One Strap	Two Straps	Three Straps
50	$\frac{1}{2} \times .020$	$\frac{3}{8} \times .015$	.....
100	$\frac{3}{8} \times .020$	$\frac{1}{2} \times .018$	.....
200	$\frac{3}{4} \times .023$	$\frac{3}{8} \times .020$	$\frac{1}{2} \times .018$
300	.....	$\frac{5}{8} \times .023$	$\frac{1}{2} \times .020$
400	.....	$\frac{3}{4} \times .020$	$\frac{1}{2} \times .023$
500	.....	$\frac{3}{4} \times .023$	$\frac{5}{8} \times .023$

Bundling

The method of bundling is practical only on products that do not need protective covering. (See Fig. 3, sketches 2, 6, 8, 16, 20, 33, 34, 35, 37, 39, 41, 44, 45, 48, 49, 50, 51, 52, 53, 55, 56, 58 and 59.)

Definite appeal to shippers for packages of this kind can be obtained by having the company name, slogan, sales message, or trade mark printed continuously on the strap. It thus becomes a new advertising or promotional medium for the manufacturer.

Bales

Baling received its greatest impetus after World War I when shippers learned the savings which the Government had effected with this type of pack.

Obviously many products cannot be baled but, in general, any item that can be compressed is suitable for baling. Some of these are: Bags, bedding, blankets, cloth, dry goods, feathers, fur, hair, hemp, hides, kapok, leather, mattresses, piece goods, pulp, towels, woolens, and yarns. Valuable storage space is saved, costs of transportation (especially on freighters), handling, and packing are reduced.

Burlap or waterproof paper is generally used as a covering material and the straps are applied while the bales are under compression. Tension is not required as expansion of the bale when released tightens the straps and takes up any appreciable slack.

The number of straps required depends upon the size, weight, and value of the baled contents. For small bales, four bands usually suffice—others may require from five to ten. The $\frac{5}{8}$ in. and $\frac{3}{4}$ in. widths of strapping are employed on almost all types of bales.

Skids

By moving production on steel-strapped skids it is possible to speed up the handling of materials, conserve valuable storage space, reduce the possibility of accidents to workmen, decrease claims for damage, increase good will in customers and substantially cut costs.

Paper manufacturers were the very first to recognize the possibilities of skid shipping and this method has been accepted as standard for years by paper shippers and receivers alike. Consider the added costs for packaging and labor if paper could not be steel-strapped to easily

movable skids—weighing up to 5,000 pounds each, and handled by one man! Steel producers are also large users of skids which not only permits easier unloading of cranes but also enables one man with a lift or power truck to move easily to the point of fabrication, loads weighing several tons.

The automotive industry has adopted skid shipping with excellent results for the manufacturers of both automobiles and parts. Products such as clutches, bumpers, mufflers, steering gears, oil filters, axles, wheels, wheel frames, springs etc., and transmission units are a few of the items that safely and economically move from the producers to the assembly lines.

Packaged articles in cartons and boxes are also placed on steel-strapped skids for ease in handling. Practically every industry can advantageously use this modern shipping method for inter-plant movement and delivery to the customer.

Some skids are designed for one trip and are non-returnable. The construction of the skids is important and the entire application requires study to meet conditions of stowing, storage, and customers' facilities. Lift truck and strapping manufacturers have accumulated a wealth of available information on this subject.

Carload loadings

The effectiveness of strapping extends also to carload loadings. Straight and mixed loads, pool and stop-over cars can also enjoy the benefits of strapping.

That the carriers recommend strapping for many commodities is evident from the publications of several divisions of the Association of American Railroads. Carriers use strapping in their own terminals for bracing LCL or merchandise cars and for re-coopering broken packages.

In box cars, steel bands are applied to half-car units of freight which permits them to absorb rather than resist shocks during transportation. Bands are also used to anchor products in box cars as well as on gondola and flat cars. Strapping is employed to brace doors of the cars using a special strapping with high tensile strength for this purpose. Tools are available to brace all types of loadings.

Strapping setup important

Steel strapping can be used advantageously only when the proper equipment is installed and the correct size of band is applied. Some packages lend themselves to automatically seal-fed strappers, mounted as an integral part of the production line; others require hand tools. In some instances movable stands for the reels are advisable while in others stationary coil holders, mounted from the ceiling or placed on the shipping floor, will permit the most efficient application of strapping. Each case is different and merits competent counsel.

Strapping has become a vital part of the packing operations in every industry. It is rapidly being recognized that what happens to a product *after* it is made is equally as important as any situation confronted by the sales, engineering and production departments.

Army-Navy Specifications for Strapping Shipping Boxes*

THE word "strap" as used in this connection means either flat metal or round wire strap.

Straps shall be applied to all boxes used as exterior shipping containers for war material and supplies. Straps shall be nailless and treated to prevent rust.

Size of flat strapping to be used shall be determined from Table 20.

(c) **Tensile strength**—The ultimate tensile strength of flat strapping shall be not less than 80,000 lbs. per sq. in. The strength of the joint shall be at least 75 per cent of the tensile strength of the flat or round wire strapping.

(d) **Tightness**—All straps shall be applied perpendicular to the edges of the box and shall be drawn tight so as to sink into the wood at the edges.

Distance of straps from box ends—If two or more straps are used, the distance between end straps and the end of the box shall be approximately one-sixth the length of the box. The intermediate straps shall be spaced equally between the end straps.

Number of straps to be used—Boxes carrying less than 125 lbs. shall have one or more straps. Two or more straps shall be used on each box when the net weight of contents is over 125 lbs. or the length of the box is over 18 ins. Boxes over 48 ins. long or carrying over 250 lbs. should have three or more straps with one additional strap for each 24 ins. in added length of the box.

(g) **Stapling of straps**—Straps shall be stapled to the boards of boxes when the thickness of the board is $\frac{1}{16}$ in. or greater. Staples shall be cement-coated and shall be located at intervals of 6 ins. to suit conditions. If any face of a box is less than 12 ins. in width, the straps need not be stapled to that face.

Staples shall be not less than .080 in. diameter (No. 14 gauge), or of equivalent cross-sectional area. The longest standard length staple that will not penetrate the boards shall be used, except that no staple longer than $\frac{3}{4}$ in. is required.

Example—Design a box, 22 ins. long, 15 ins. wide and 10 ins. deep to carry 75 lbs. of loose castings. It is desired that a Style 2 box be used.

The nature and pack of the contents require the box to be designed for Type 3 load.

* Table numbers and chapter citations which follow refer to the complete specification on shipping boxes as published by the Government.

(a) Minimum thickness of box parts—see Table 14, page 36.*

Sides, top and bottom:

Group I and II woods— $\frac{1}{2}$ in.

Group III and IV woods— $\frac{7}{16}$ in.

Ends and cleats:

Group I and II woods— $\frac{5}{8}$ -in. ends with $\frac{3}{8}$ -in. \times $2\frac{1}{4}$ -in. cleats

Group III and IV woods— $\frac{5}{8}$ -in. ends with $\frac{3}{8}$ -in. \times $1\frac{3}{4}$ -in. cleats

(b) Number pieces in each part—see Table 15, page 34.*

Top and bottom—not more than 5 pieces

Sides—not more than 3 pieces

Ends—not more than 3 pieces

(c) Size and spacing of nails—see Table 14, page 36; Table 18, page 39, and Table 19, page 39.

Sizes to ends and cleats (end grain)

All groups of woods—5-penny nails, average spacing $1\frac{3}{4}$ ins.

Top and bottom to ends and cleats (side grain)

All groups of woods—5-penny nails, average spacing 2 in.

Ends to cleats—(side grain)

Length = thickness of end + thickness of cleat + $\frac{1}{8}$ in. = $\frac{5}{8}$

in. + $\frac{5}{8}$ in. + $\frac{1}{8}$ in. = $1\frac{3}{4}$ ins.

Four penny nails are required (see Table 4, page 10)* spaced 2 in. apart (see Table 19, page 39, side grain nailing)

See Fig. 23 for nailing pattern

Top and bottom to sides—see Table 18, page 39*

Group I woods—6-penny

Group II woods—5-penny

These nails space 6 ins. to 8 ins. apart

Group III and IV woods—no side nailing permitted

(d) **Strapping**—Two wires or bands shall be used since the box is over 18 ins. long.

For flat metal bands—Two bands shall be used, each $\frac{3}{8}$ in. \times .020 in.

For round wires —Two wires shall be used, each of 14 gage 100,000 psi. wire or 15 gage 140,000 psi. wire.

Location —The above straps shall be placed approximately 4 ins. from each end of box.

Table 20—Sizes of Flat Metal Bands for Various Weights of Boxes

Maximum gross weight	Dimensions of flat metal bands, when different numbers of bands are used		
	1 band (ins.)	2 bands (ins.)	3 or more bands (ins.)
Up to 70	$\frac{3}{8} \times .020$	$\frac{3}{8} \times .020$	$\frac{3}{8} \times .020$
Over 70 to 125	$\frac{1}{2} \times .020$	$\frac{3}{8} \times .020$	$\frac{3}{8} \times .020$
Over 125 to 175	....	$\frac{1}{2} \times .020$	$\frac{3}{8} \times .020$
Over 175 to 250	....	$\frac{5}{8} \times .020$	$\frac{1}{2} \times .020$
Over 250 to 400	....	$\frac{3}{4} \times .020$	$\frac{5}{8} \times .020$
Over 400 to 600	....	$\frac{3}{4} \times .023$	$\frac{3}{4} \times .020$
Over 600 to 1,000	....	....	$\frac{3}{4} \times .023$

The size of round wire strapping to be used shall be determined from Table 21.

Table 21—Gauge of Round Wire for Various Weights of Boxes

Gross Weight (Lbs.)	1 Wire		2 Wires		3 or More Wires	
	100,000 lb. per sq. in. tensile strength (gauge)	140,000 lb. per sq. in. tensile strength (gauge)	100,000 lb. per sq. in. tensile strength (gauge)	140,000 lb. per sq. in. tensile strength (gauge)	100,000 lb. per sq. in. tensile strength (gauge)	140,000 lb. per sq. in. tensile strength (gauge)
Up to 70	14	15	15	15	15	15
Over 70 to 125	13	14	14	15	15	15
Over 125 to 175	..	..	13	14	14	15
Over 175 to 250	..	..	13	13	14	15
Over 250 to 400	..	..	13	13	13	14
Over 400 to 600	..	..	12	$12\frac{1}{2}$	..	13
Over 600 to 1,000	..	..	..	..	12	$12\frac{1}{2}$

Wire-stitched Containers

by Prescott C. Fuller

WIRE stitching, as a quick method of assembling and sealing containers, is easy to apply and makes a joint that is securely fastened. It is suitable for any type of container irrespective of size, construction of the flaps, or the kind of board. The process is inexpensive, as moderately priced machines are available and wire stitches can be had at nominal cost. There is no waste of either time or material, when a box is stitched. Furthermore, when goods must be repacked or stored, the stitches may be easily removed without appreciable damage to the case.

All wire stitching machines are variants of the simple box stitcher. This comprises a stitcher head, a body or frame which supports the head and also contains the driving mechanism, a base to support the body and a horizontal arm to hold the work. The end of this arm contains the clinching device.

Stitching heads are of two general types: 1) wire fed from the side; 2) wire fed from the top. Both types have a mechanism that feeds the wire and cuts it into predetermined lengths. It then receives the piece of wire and transfers it to the bending mechanism, which forms the legs, and the stitch formed is supported and guided while it is being driven through the material. The arm contains a grooved clincher which receives the legs of the stitch and bends them inward and tightly against the under side of the flaps of the container.

Heads with side-fed wire are usually employed for the stitching of containers, since they can be more ruggedly constructed, while the vertical-fed type is used for multiple-head work.

The clinching arm can be quickly adjusted up or down to accommodate varying thicknesses of material, and the wire feeding is also instantly adjustable. Angle arms can be obtained for handling special classes of work, and adjustable gauges for facilitating repetitive operations. Machines are available with the stitcher head so adjusted that stitches can be driven at a 45-deg. angle to the grain or the corrugations of the container board.

Many different sizes and shapes of wire may be used. The wire most frequently employed is of copperized or galvanized steel, .103 in. wide and .017 in. or .020 in. thick. Another popular type of wire is 0.60 in. wide and .020 in. or .024 in. thick. The number of stitches of average length in a pound of wire will run from 1,600 to 2,500 and the cost from three to five cents a thousand. The ends of the wire can be cut square or at an angle of 45 deg., as desired. Stitching wire comes on 10-lb. spool-less coils, an aluminum spool-holder being used in setting it up on the machine. The usual crown length is $\frac{3}{8}$ in. or $\frac{7}{16}$ in., although for certain special purposes longer

or shorter crowns are sometimes employed. The width can be changed by installing the proper parts.

The following sections describe the more usual applications of wire stitching in the assembling and sealing of containers as now practiced and also certain uses for special purposes.

Slotted containers

Although it is quite possible to stitch the manufacturer's seam of regular slotted containers on a standard box stitcher, it is not the usual practice for runs of any considerable length. Most plants use a special type of machine, developed expressly for this purpose.

If production is limited, and the standard box stitcher is used, the box blank is folded over the arm, with the flap in position, and stitched as it is being withdrawn from the machine. The advantage in making up boxes in this way is that the flange may be more accurately opposed to the adjacent side than when the box is folded on the creases and then stitched. Stitches are placed $2\frac{1}{2}$ in. apart, with tie stitches very often used at each end of the seam, although on boxes less than 18 in. in depth the classification permits a spacing of 3 in.

The regular stitcher for slotted containers has a table on which the blank rests and also a device with an open head or clincher tongue which is bolted to the stitcher head and rigidly or semi-rigidly supported by it. This device serves merely as a double guiding member and clincher arm to hold the flange and the opposite side panel in proper position during the stitching. The blank for the box is folded along two opposite creases so that the flange overlaps the adjacent panel; both flange and panel are then guided through the open head and stitched. The finished box is removed from the discharge end of the machine, thus making a continuous operation in one direction.

The practice usually followed is to have the operation handled by two girls, one of whom folds the blanks on the creases and passes them to the other girl, who pushes them through the open head of the machine and stitches the seam. The size of the box, particularly the depth, and the skill of the operator are factors which determine the rate of production. It is possible for one girl to handle the entire operation, but the speed is materially reduced.

Important developments have recently been made on the automatic stitchers used for this work. When using this new type of machine, the operator has only to fold the blank, which places the stitching flap in an overlapping position, and feeds it into the open head of the machine. The machine automatically picks up the

blank, feeds it, inserts the stitches at predetermined spacing, and ejects the completely stitched blank at the rear of the machine by means of high-speed rolls. The operator meanwhile has folded another blank ready for feeding. Tie stitches may be placed at each end of the blank, if desired.

To increase production and reduce labor costs, automatic elevators have also been developed which can be attached to either the regular hand stitcher or the automatic machine. This elevator consists of a roller table which will lift a pile 42 in. high and is equipped with a governor which keeps the blanks on the top of the pile at constant feeding level, regardless of their thickness. When the pile has been fed off, the table is lowered quickly, loaded with a new stock of blanks, and the operator immediately begins to feed the new pile into the machine. Production can be increased 20 to 30 per cent with this elevator.

Three-piece (Bliss) boxes

In one style of three-piece box the flanges to be stitched are made a part of the body blank. This is usually assembled on a box stitcher, with a nub placed over the end of the arm to form a guide or spacer and bring the stitches right to the center of the flange; a panel holder is also furnished. The operator first pushes the top flap of one end panel into the panel holder, then folds the body into shape and pushes it over the end panel. Holding the sides and end panel firmly in the hands, the box is placed over the stitching arm and the bottom flange is attached by means of a single stitch in the center. The three flanges are then stitched together, tie stitches usually being placed at the top and bottom of the side flanges for greater rigidity and strength.

In another type of this box the flanges are made part of the end panels. This is assembled on a special stitcher which has two heads set at 45 deg. A movable and adjustable work table is placed between the stitcher heads, and the edges of the table serve as guides in the assembly of the box. The body blank is laid on the table with one top flap bent down in front of the operator, who holds the two end panels in position against the sides of the table so that the flanges overlap the first side of the box in the proper position for stitching. One stitch is placed while the table is in its outward position; the table is then pushed in and the remainder of the stitches placed in order, automatically spaced. The body blank with the ends attached is then moved forward and bent over the end of the table, thus presenting the bottom for stitching. The flanges on the bottom of the ends are folded in place and stitched as before. The third operation is a repetition of the second and this completes the assembly of the container.

Telescope boxes

The blanks for heavy telescope boxes are received flat by the customer and may be creased twice at each corner, with diagonal slotting, so that the corner flaps fold up in triangular form, against either the ends or the sides of the box as desired. (Figs. 1 and 2.)

The flaps are stitched on a box stitcher in the manner shown, the number of stitches to be placed depending upon the weight and character of the contents. Sometimes one of the triangular flaps is folded outside the end and the other inside the side, both being stitched in place to give added strength. Another method of making up such a box is to crease and slot the corners so that when it is assembled, it makes rectangular corner flaps which are folded up against either the end or the side of the box. (Figs. 3 and 4.)

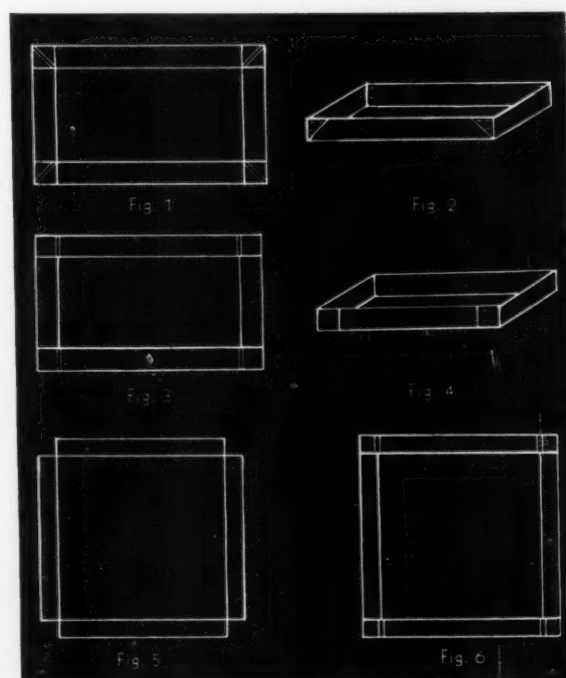
Folding suit boxes

A suit box, whether in two pieces or one is usually stitched by hand on a single-head stitcher provided with a gauge. Display boxes, laundry cases, and hardware boxes are of the same general type and all can be set up quickly by this method. Light-weight stock is generally used in these boxes.

Cracker caddy covers

The covers of the familiar cracker caddy are about 10½ in. square, with flaps from ¾ in. to 1 in. wide. The flaps may be arranged as shown in Figs. 5 and 6.

When the corners are cut out as shown in Fig. 2, the covers are stitched on a corner-staying machine, using a stitch with its crown bent at an angle of 90 deg., one leg being clinched in each flap. The driver is cut out in the center to accommodate this and a moving mechanism brings the flaps tightly together and clinches the legs of the staples flat against them. The arm of the machine is also shaped in a 90-deg. angle. The operator sits in front of the machine and stitches the four corners in succession, frequently working at a rate of 15 or more covers a



minute. The usual type of caddy cover is cut out at the corners, but the one shown in Fig. 6 is sometimes used.

Bottom stitching

A bottom stitcher is the same as a standard box stitcher except that there is no clincher arm; instead, there is a vertical post mounted on the base or frame. The post is $1\frac{1}{2}$ in. to $2\frac{1}{2}$ in. in diameter and the clincher is fitted into the top which is thus reduced to 1 in. to $1\frac{1}{2}$ in. in diameter. The head of the post is adjusted up or down by hand, to accommodate different thicknesses of board and the post is usually constructed with a heavy spring inside, so that, if extra-heavy material is inserted without proper adjustment, the spring will give and the stitcher head will not be damaged by the strain. The post is hinged at the bottom, and when the foot pedal is depressed, it tilts forward to permit insertion of the box.

When small or medium-sized boxes are to be stitched, it is advantageous to have a type of bottom stitcher with a considerable opening between the top of the post and the head of the stitcher so that the operator can save time by placing the boxes in stitching position over the post without tilting the latter forward. The foot pedal is then used to set the stitcher in motion and a succession of stitches may be driven without stopping the machine.

When a large volume of containers is to be stitched at the bottom, duplex- or multiple-head machines are often used. Duplex-head machines have a single head arranged to drive two stitches at once, with the crowns in line and spaced $2\frac{1}{2}$ in. apart. A short bar is placed on the top of the bottom post, fitted with two clinchers properly spaced. Multiple-head machines have either two fixed non-adjustable heads for repetitive work on one size of the box, or adjustable, narrow type heads.

Bottom stitching of slotted containers

More and more industries are turning to bottom stitching as the best method of fastening the bottom flaps of slotted containers before they are loaded. The box is held firmly in shape, with a secure bottom closure, while the goods are being inserted and the boxes may be assembled as needed. One of the advantages here is that a stitched container is never affected by moisture, which might weaken another type of closure. This is particularly important when filled boxes are to be stored.

Of the several conditions of bottom stitching met with, the more important are described below:

All flaps of case meet in center: This condition is met in all square containers or in containers especially slotted at the center. The box should be held firmly at both sides to keep it square and avoid any gap between the outer flaps. The stitches should not be over $2\frac{1}{2}$ in. apart and along the edges of the abutting outer flaps they are usually placed close to the edge. Stitches should be tightly clinched so that the inside of the box will be smooth. When stitching corrugated boxes, the container may be held at an angle to the machine, thus allowing the stitches to be driven diagonally across the corrugations.

Outer flaps meet, inner flaps not over 6 in. apart: The same method of stitching is used on slotted cartons which are not square, but in which

the inner flaps are not more than six inches apart. No stitches are placed except where there are two thicknesses of board.

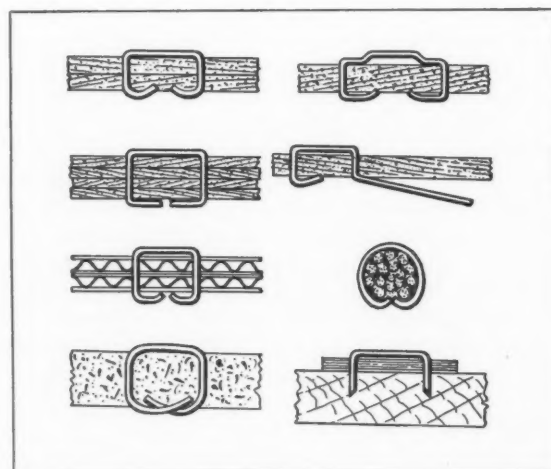
Outer flaps overlapped: Containers of this construction are much used in the shoe and other industries, and when stitched on a single-head machine, the center overlap (1 in. or more) is stitched first, the sides of the box being firmly held between the hands of the operator. The stitches are placed across the overlap first as the box is most easily held when the seam, or length of the box, is in the direction of the body of the machine. The stitches on the ends may be placed either in the same direction as those on the seam or at a 45-deg. or 90-deg. angle.

Full overlap boxes: Boxes with the bottom flaps fully overlapped are often sealed with glue, but if they are to be wire-stitched, the overlap is usually cut down to 1 inch to save material, except where the case is very long and narrow and extra rigidity is wanted.

Double-head and duplex-head bottom stitching

When the outer flaps of the box meet and the inner flaps either meet or are not over 6 in. apart, double-head bottom stitching may be used. The heads are set so that one stitch will be driven just inside the end of the box and the other just inside the edge of the opposite inner flap. The ends of the clincher bar form guides for spacing the stitches from the side of the box. When one side is completed, the box is moved over on the post and the other two rows are placed.

The duplex-head stitcher, which drives two stitches at once, spaced $2\frac{1}{2}$ in. on centers, can be used on all boxes, whether the outer flaps meet or overlap. When used on a box with the outer flaps meeting, the center seam is stitched first, one stitch at each side of the joint. In order to bring the stitches closer to the joint, instead of holding the box straight it may be held at an angle to the machine, and the stitches driven in diagonally. The ends of the box are then stitched, the stitches being



Illustrated above is the application of wire stitching to various types of work. Also shown are some of the different forms of staples readily available.

placed in order, two at a time. When stitching a box with center overlap, it is easier to stitch the ends first, and then complete the center seam.

A skilled operator can do the fastest possible stitching with a duplex-head machine by holding the foot pedal down, which makes the machine operate continuously. The box is placed over the post and the top right side is stitched first. During the intervals between stitches the box is moved rapidly to the top left side, the bottom left, etc., and the foot pedal is not released until all the groups of two stitches have been placed.

In single-head stitching, one operator can complete three to six boxes a minute; with a duplex- or double-head machine this output may be increased at least 75 per cent. Duplex-head stitching is widely used because it is adaptable without adjustment to all sizes of boxes and for all flap constructions, and is much faster than single-head stitching under average conditions.

Top stitching

A standard top stitcher is a box stitcher which has a thin steel blade with the clincher set in the end instead of the solid clincher arm. This blade anvil is made of forged steel, tapered toward the front to make it thin.

Filled containers are always stitched at the top, the steel blade or anvil being inserted under the flaps after they have been folded down. As filled boxes are usually rather heavy, a work table fitted with ball bearings is provided, on which the box may be moved easily in any direction. The table is balanced by springs or counterweights and may be quickly adjusted up or down with a minimum of effort. The operator places the box on the table, moves it to proper position for the insertion of the blade, stitches the flaps and removes the case to a truck or conveyor.

The most efficient method of top-stitching involves the use of a table lifted by the motor on the machine. A special clutch connects the motor to the table-lifting mechanism and a separate double-action foot pedal is used to control it. When the back of the foot pedal is depressed, the table and case are automatically lifted till they meet a stop attached to the head which brings the table to rest at just the right level for the blade anvil to enter under the top flap. A touch of the toe to the front of the pedal lowers the table again after the top flaps have been stitched.

This machine can either be placed beside a conveyor system or made a part of it. A loaded case is moved to the table, raised by the power lift, stitched, lowered and pushed on to the discharge conveyor. This allows the operator to handle many more cases than by the old method, and it results in a minimum of physical effort.

In a small or departmentalized plant, another machine, a combination top-and-bottom stitcher, is very popular. This machine is equipped with both a blade anvil and table and a bottom post. In bottom-stitching, the table and anvil are swung out of the way; for top-stitching, the post is easily removed, without the use of tools.

Some practical uses of top-stitching, other than the sealing of regular slotted containers, are: stitching the

ends of mattress cases; stitching the tops of cracker boxes and caddies (by inserting the blade anvil through die cut slots close to the edge); sealing the ends of boxes for automobile bumpers, and other long boxes with a relatively small space at the ends.

Shopping bags

Box stitchers may be adapted to fasten the twisted fibre stock handles to shopping bags. The handle is shaped and placed in position with the two ends overlying the folded top of the bag. Two standard box stitches are used at each end to hold the handle to the bag. Gauges are added, and the bottom of the driver has a round groove cut in it which fits over the handle of the material. A neat-appearing and securely fastened job results.

Closing of bags

The closing of filled paper bags by stitching is common practice with many manufacturers. When the bag is made of heavy material, a standard box stitcher is used. The top of the bag is either folded over once, or a double seal fold may be used, and two or more stitches are inserted. This process is used for bags containing coal, chemicals, fertilizer, seed, and other products. If the bags are very heavy, the work is best done on a machine with a horizontal stitcher head, instead of driving the stitches vertically as usual. A table equipped with rollers is placed under the stitcher, or a regular conveyor is used, on which the bags stand with the flaps at the right height for closing.

Portable bench stitcher

Portable stitchers, easily carried from one job to another, have proved particularly useful for the stitching of filled paper bags, containing potato chips, crackers, noodles and other products. The top of the bag is inserted below the driving mechanism and an automatic trip activates the solenoid which causes the stitch to be driven. These machines may also be used for attaching articles to cards and for making small boxes.

Stitching through sheet steel

The development of specially constructed stitchers for penetrating sheet steel originated through a need for such a method in the automobile industry. Such machines are now standard equipment and have a variety of uses: to attach weather stripping; to attach molding; to fasten metal rims on fibre drums; stitch metal handles to drums, and for use with many other products that formerly were fastened by riveting.

Special arms and guides can be provided to facilitate the placing of stitches in recesses or on rounded surfaces. When it is essential that the crown of the staple be concealed, as in attaching upholstery to metal frames, the driving of the stitch may be so controlled that the staple is buried beneath the surface of the work. Although the stitcher may be driven continuously, non-repeating clutches have been developed which facilitate the even spacing of stitches and permit only one stitch to be driven each time the foot pedal is depressed.

Fibre Drums

by R. W. Lahey

"FIBRE drums have gone to war." This popular, often repeated phrase has no more appropriate application. In the early part of 1942, demands for these containers started to mount as a result of the efforts of far-sighted packers to substitute fibre for steel containers. It was not long before production capacity was taxed and the old line manufacturers found that it was impossible for them to accept new business. During this period, development of several new types of fibre drums was speeded up with the encouragement of the Containers Division of the WPB. It is not reasonable to expect that new manufacturers can offer, within the space of a year, con-

tainers that equal in every way the drums which have taken over 10 years of effort to come to their present high level of quality.

To complicate this situation the new demands for non-metallic containers have become more difficult to satisfy. The vast majority of products heretofore packed in these containers required only extra protection from absorption of moisture-vapor, freedom from contamination of dirt, wood splinters, rust, etc., and light tare weight. These new demands are much more exacting. Containers are urgently needed for semi-liquids and liquids, namely, greases, inks, oil and water paints, hydrogenated oils, liquid adhesives, etc. There is also demand for fibre drums that can stand outdoor storage, submersion in water and can provide adequate protection against the transmission of moisture-vapor.

We are now in the midst of an intensive development activity which it is hoped will bring forth satisfactory containers for these materials. Some containers have been offered for these special services and are now in use. We will soon know as a result of shipping experience, how well they have solved these difficult packaging problems. There is still much of this work under way, the successful conclusion of which industry is anxiously awaiting.

The WPB issued, late in February, Order P-140 which sets the priority pattern for the procurement of fibre drums as well as other fibre and wooden containers. This order will probably make some changes in the products which are packed in fibre drums.

The manufacturer who at this time must choose non-metallic containers for liquids, greases, and even semi-liquids has a difficult task. Six months or a year from now, when these containers have been proved by actual transportation and storage experience (the only tests which are completely dependable), it may be possible to list certain fundamentals of construction which should receive consideration before adopting fibre containers for services in which they have not heretofore been used. Paper containers of 1 gal. capacity and smaller, and which are transported in outer shipping containers, have different structural requirements than have the larger containers, usually 5 gals. and larger, and which are used as shipping containers without any additional pro-



Lubricating oil companies, severely restricted in the use of metal drums, have adopted alternate types of containers. 1. Fibre-sided drum for low viscosity hydrocarbon. Photo Socony-Vacuum Co. 2. Fibre-bodied drum with metal ends and coated interior replace all-metal drum (right) for greases. Photo Texas Oil Co.

tection. The following suggestions are limited to the latter type only.

(1) Fibre drums are flexible containers and any outside linings, interior coatings, adhesives between the plies, and coated or laminated plies must have the same degree of flexibility.

(2) In the wound type of shell or cylinder the convolute construction is the only type which has been proved in the mill of actual shipping. Other cylinder constructions may prove adequate but they should be carefully tested. The stresses and strains on sidewalls are much greater for the larger sizes such as 30 to 60 gals. than for the smaller sizes.

(3) The junction of the cylinders with the heads and bottoms require particular attention. These joints have, in the past, proved to be the most difficult problems for drum fabricators. As the drums receive the greatest abuse they must be adequate.

(4) Linings which are designed to hold materials which are not dry, must be specially prepared for each specific product. Linings which are impervious to hydrocarbons are usually soluble in aqueous solutions or emulsions. Tests of these linings should be made after subjecting test containers to transportation abuses to make sure that the stresses and strains of shipping do not impair their efficiency, particularly at the bottom joints and closures.

In the last year there have been several changes in the Regulations for the transportation of dangerous articles of which the following are of the most importance. (*The Regulations for the Transportation of Explosives and Other Dangerous Articles* should be consulted for complete details.)

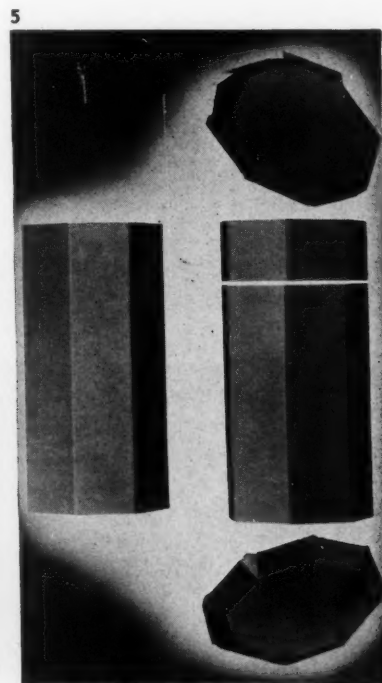
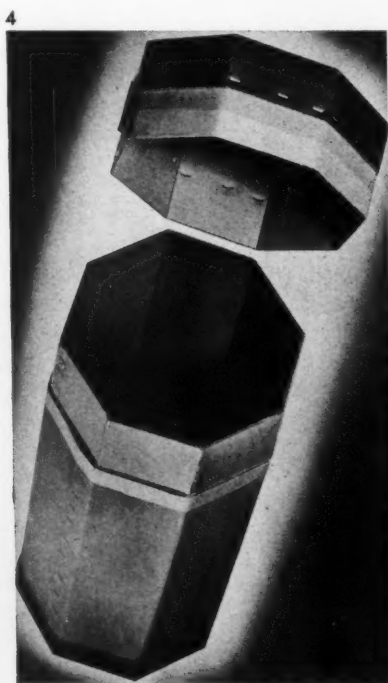
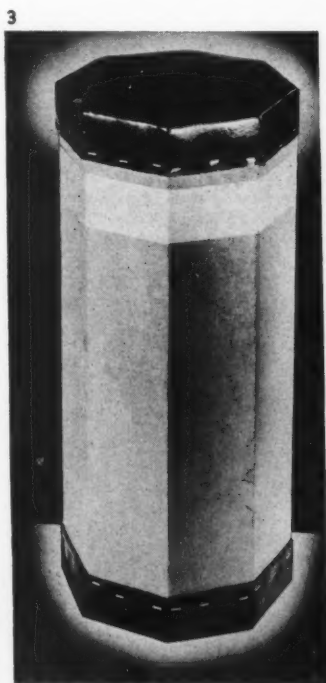
(1) Certain inflammable solids, smokeless powder and a few poisonous solids have been approved for transportation in Specification 21A fibre drums specially constructed for adequate protection. Drums for packing inflammable solids such as sodium hydrosulfite, sodium sulfide and potassium sulfide must contain special protection against the admission of enough moisture to create hazardous conditions in transportation.

Cyanides and arsenical compounds have also been approved for shipping in these drums. In addition to the special protection against the entrance of moisture, drums holding these poisons must stand more severe drop tests than those required by the I.C.C. 21A Specification.

(2) Specifications for a new type of drum No. 13A was approved for transporting low explosives such as black powder with a maximum net weight in one container of 25 lbs.

(3) Another new specification (21B) with size limited to 5 gals. has been approved as an emergency container for inflammable liquids. When paints, enamels-

3, 4, 5. Self-contained corrugated container for chemicals. Due to its patented construction, top and bottom are stapled, eliminating possibility of sifting. By bringing both outer sections of the container to a butt and applying tape around circumference, no stress is placed on tape and the closure becomes strong.



varnishes, shellacs and lacquer with flash point above 20° F. are packed in these drums, the 4-foot drop test requirement of the specification has been reduced to one drop of 2 feet diagonally on the bottom chime and one drop flat on the head.

Most of the manufacturers of convolutely wound drums with fibre, wooden and steel heads, have made minor changes in their containers to adapt these drums to hold greases, pastes, etc. This has been accomplished by the development of impervious linings, use of new adhesives, the addition of coated or laminated plies or combinations thereof. Some protection against the weather has been provided by lacquered and pigmented coatings. Certain treatments to withstand heat and pre-

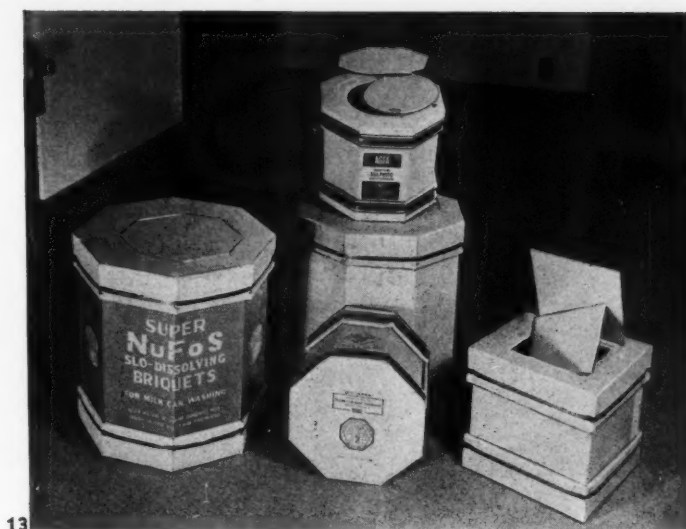
vent materials from sticking to the paper walls of the drums have increased the acceptability of these containers for packing hot liquids (even over 400° F.) which solidify when they cool.

The Steelfibre drum recently offered to the trade is of the convolutely wound construction. It differs from other steel-headed drums of this type in that the ends of the cylinders are folded double and glued. This increased thickness provides a more secure anchor for crimping the steel heads to the shell. It also extends the chime beyond the plane of the sidewall, so that the container rolls on these steel-covered chimes when on smooth surfaces. Heads are fabricated of from 24 to 28 gauge steel and openings are of the friction type up to 12

War baby of the fibre drum family using same construction and materials as for concrete construction molds. 9. Complete drum with top in place. 10. Diagram showing wall, top and bottom construction with inner liner. 11. Drums showing the outside and inside of container. Note construction of lid and split ring. 12. Long tubes, ordinarily used for the concrete mold are cut into suitable lengths and fitted with top and bottom, as well as inner sleeve. Photos Beacon Container Co.



13. "Drumpak" fibreboard drums in various types and sizes. 14. The flat drum is opened and slipped over the mandrel for application of the bottom. If a bag inner liner is used, this is slipped over the mandrel first. 15. The bottom is placed down over the body, flaps of bottom lined up with flaps of body. 16. The closing device is set down on the bottom and the flaps interlocked as shown by the operator's left hand; a flange of the closing device holds the interlocked flaps in place while the remainder are interlocked. 17. With the closing device still in place, the steel strap is adjusted and sealed on. The top is similarly applied Photos Gaylor Container Corp.



ins. in diameter. Sidewalls are laminated with 4 to 18 plies of kraft board. Drums are made up to 55 gals. in size.

The spiral wound construction has been adapted to the larger fibre drums by two manufacturers. The Beacon Container Co. has recently announced the "Ring Seal" container which has been designed to meet I.C.C. Specification 21B to hold 5 gals. of inflammable paints. It consists of an 11-ply outer spiral wound shell $\frac{1}{4}$ in. thick containing a single-faced asphalt impregnated or laminated "A" flute corrugated fibre inner sleeve which is butt jointed and covered with kraft tape. The combined shell has a calculated Mullen test of 1,200 lbs. The shell is coated and treated to provide water resistance.

The bottom and top construction is illustrated in the appended drawing. It consists of a ring washer which is glued against the inner periphery of the outer shell and butts against the end of the inner sleeve. The function of this ring is to close the end of the corrugated fibre tube and form a bearing surface for the bottom discs. The bottom closure consists of an inner corrugated

asphalt impregnated disc, then two solid fibre discs of different diameters glued and stapled together. This bottom assembly is .48 in. thick and has a calculated Mullen strength of 1,800 lbs. exclusive of the corrugated fibre disc. The discs are held in place by a hardwood split ring with a minimum overlap of 2 ins. stitched to the outer shell with No. 18 wire.

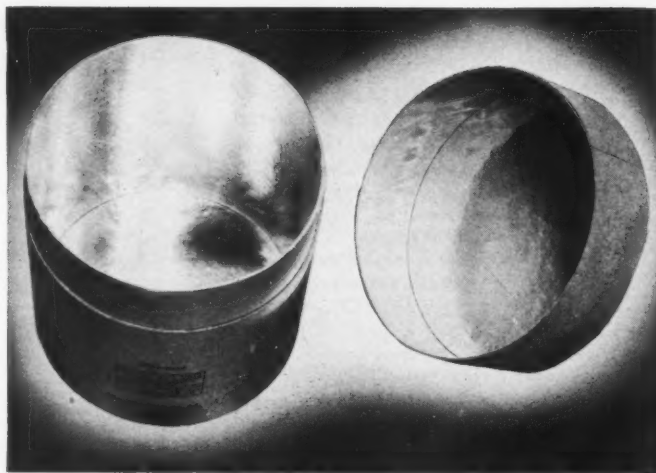
The top is similar in construction to the bottom except that it is equipped with a suitable pull tab and is stitched, stapled or nailed in place. A special tool is required for sealing which is supplied by the manufacturer.

The continuous fillet or bead is applied to the joint of the cylinder and the bottom before the container is lined. These lining compounds are varied to meet the needs of the materials to be packed. The closure is sealed by application of an adhesive compound to seal the coated inside disc to the bearing surface of the ring washer.

The Seeley Tube and Box Co. has recently developed a spirally wound fibre drum to hold 25 lbs. of black powder and low explosives. This container meets I.C.C. Speci-

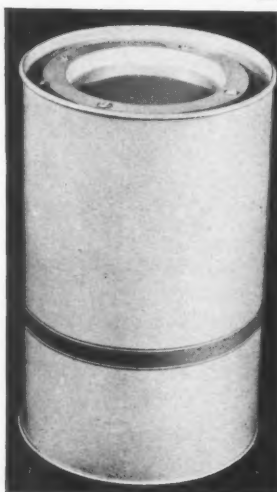


18



19

20



21



18. Drum of laminated convolutely wound kraft; wall $\frac{1}{4}$ in. thick. Top and bottom of wood; interior coated to suit product. Metal flange lock top. Photo Carpenter Container Corp. 19. Fibrepak drum for shipping chemical and pharmaceutical products; can be adapted to carry greases and semi-liquids. 20. Keystone drum with steel head and bottom double-seamed to fibre shell. 21. Light waterproof fibre drum for shipping dry bulk products. Photos 19 and 21, The Container Co. 20, Keystone Drum Co.

fication 13A. The shell is formed from two spirally wound shells, each of which is five-ply construction set with asphalt. The sidewall of each shell is $\frac{1}{8}$ in. thick. The outer shell is attached to the inner shell with adhesive and extends beyond the inner shell at each end. The bottom consists of a $\frac{1}{4}$ -in. disc that extends over the ends of the inner shell and it is attached with an adhesive to the end of the inner shell. It is held in place by a fibre ring which is wire-stitched to the outer shell. The top or cover is attached, after filling, in the same way as the bottom. The supplier will provide a stitcher for attaching the top ring. Drums can be supplied in a maximum diameter of 14 ins. I.D. and a maximum height of 28 ins. O.D. This drum can also be made with crimped-on metal tops and bottoms. The opening is a 7-in. friction plug.

The inner ply of the shell and top and bottom discs may be of coated or laminated paper as desired. The interior may be lined by spraying or sloshing with any satisfactory type of lining material.

This company also manufactures a spiral wound can with crimped-on metal top and bottom to hold 10 lbs. of

chlorinated lime. The spiral wound shell is formed with an inner asphalt laminated ply and seven other plies of chemically treated paper. This container is made $7\frac{1}{4}$ ins. inside diameter and 9 ins. inside height. When the metal top is removed the container cannot be resealed.

The Gaylord Container Corporation have been marketing, for a few years, a hexagonal drum, called "Drum-pak" fabricated from high-test corrugated board. In the last year, this container has been further improved and has been substituted for steel drums in several instances. Dry products with a particle size of $\frac{1}{8}$ in. and greater may be shipped in these drums without liners. Creped bag liners similar to those used in barrels are required with finely powdered and hygroscopic materials as well as moist products.

The side seam of the shell is formed as in a fibre box by wire stitching or with extra heavy 3-in. width cambric tape. The drum is shipped knocked down with the proper assortment of tops and bottoms. It is easily assembled by the use of a mandrel and a specially adapted closing device furnished by the supplier. Heads are interlocked with the cylinder somewhat like the double seam of steel drums. These cover flaps are notched, forming a slight recess for the steel strapping which secures the heads to the cylinder. The steel strapping is usually the $\frac{3}{8}$ -in. curved edge although round wire strapping can be used. Strapping is applied with a hand stretcher and a sealer. A specially designed "dispensing head" has recently been designed which permits the removal of a small portion of the contents at a time and which effectively reseals the drum for extended storage.

Linings for Fibre Containers

by Elon R. Brown

MANUFACTURERS of fibre containers are being deluged by requests to develop containers for many types of materials which were formerly packed in metal containers. As has been already noted, considerable progress has been made in the research and development of special linings and outside coatings for metal containers to insure non-toxic and non-corrosive effects on the materials packaged.

Today the fibre container industry is developing and perfecting various substances to give the same protection to many types of materials formerly packaged in metal containers, through the use of various chemical linings, adhesives, laminants and sealers, and by the use of various types of paper, in combinations of one or more layers, in order to make the fibre container equal to the metal container in durability and protective qualities.

The fibre containers discussed here are of two types—the canister, or small package, and the drum, or bulk package. The problems for both types of fibre containers are very similar in regard to laminants, sealers and impregnations used in their construction. For this reason the discussion of these materials will not be broken down but handled as a unit.

Fibre containers for peacetime uses

Before the war brought additional problems, fibre containers were manufactured for many peacetime uses, principally for products that required maximum protection

against contamination and, in some cases, required a waterproof package. These types of packages, because of their inexpensive construction, had been manufactured for some time and were more than satisfactory. They were used principally for dry materials, including molding powders, pharmaceutical chemicals, rubber accelerators, cleaning powders, poisonous insecticides, inflammable solids, C.P. chemicals, etc. The food industry has adopted the fibre drum for bulk shipments of ground coffee, cocoa, spice, powdered milk, powdered eggs, baking powder, salted nuts, certain grades of meats and fresh fruits. Fibre drums also provided adequate protection for rolls of transparent wrappings, sheetings and fabrics.

Most of these containers consisted of spiral wound or convolutely wound sides with metal closures on each end. A few, however, were made of all fibre and used to package certain pharmaceutical chemicals, foodstuffs and specialties such as ice cream. These materials were packaged without the use of metal because of the possibility of contamination. With the increased demand for metal for war use, pressure has been brought on the fibre container manufacturer to develop adequate containers using no metals.

Fibre containers for today's demands

Fibre container manufacturers, in addition to overcoming the handicaps caused by the metal shortage, have been called upon to package materials heretofore considered

1. Fibre drum with asphalt barrier-board interior construction shown with metal drum it replaces. May be fabricated with inner lining of paraffin, cellulose acetate, glassine or vinylite. Capacity, 24 to 75 gallons. Photo The Container Co.





2. 30-gal. drum replaces steel container also shown. Suitable for inflammable solids, oxidizing materials and Class B poisons. 3. Drum fitted with wax impregnated kraft paper disc and ingenious metal band closure. Photos The Container Co.



impossible to package in any other than an all-metal container, and such fibre containers are now being used on materials actually going to the fighting front.

Bleaching Powder Compounds are being packaged in waterproof and moisture-vaporproof containers made of ordinary chip board and kraft paper, using an asphalt or an asphaltic compound as a laminant together with a waterproof, chemically resistant laminant. This bleaching powder is used to refill decontamination cans and serves the same purpose as the all-metal bleach drum.

20-Millimeter Shell Cases consist of an elongated tube and are manufactured in much the same way, using the same laminants. This type of container is used to store the shells before actual use. These shells must be protected from water and moisture-vapor in order to insure maximum effectiveness when used.

Other war materials such as tetrol, DNT, guanadine nitrate and smokeless powder are also packaged in fibre containers.

Foodstuffs for our armed forces and the lend-lease program are also being packaged in fibre containers that have been specifically designed for bulk shipments of perishable goods. These containers also must have particular laminants. Fillers, sealers and linings must be tasteless, odorless, waterproof and moisture-vaporproof. For these shipments of dry materials, special laminants are used and combined with a particularly water-impervious vegetable parchment paper, or it may be necessary to use materials such as cellophane, glassine or a rubber hydrochloride sheeting.

Some of the strategic materials formerly packaged in steel are potassium permanganate, molybdenum, synthetic rubber, vinyl resins, polystyrene, phenolic resins, urea resins, photochemicals, chlorate of lime, organic

and inorganic dry colors, dyestuffs (dry), powdered magnesium, shellac (dry), *lithopone*, gelatin, X-ray films, printing inks and paints.

Fibre containers, some all fibre and some with metal ends, have been adapted to package materials like calcium cyanide, sodium cyanide and sodium hydrosulphate, all of which, when exposed to moisture, give off a poisonous gas. For the packaging of the more active chemicals, a chemically resistant, waterproof and moisture-vaporproof laminant has been developed that gives maximum protection. Fibre drums have been made moisture-vaporproof by the use of a so-called "asphalt barrier-board." In other words, the drums use an asphalt or asphaltic compound as a laminant and have a resinous varnish (phenolic and urea) on the outside of the drum to make it more weatherproof.

Great strides have been taken in the progress of fibre containers. For instance, viscous materials such as jams, icings, fondants and various types of viscous mixes are now being packaged in fibre drums. For this type of package, rubber hydrochloride was used for the inner laminant. While this material is now unattainable, very good results have been obtained by the use of a cellulose acetate and an asphalt or asphaltic compound for a laminant. Aluminum foil was formerly used for some corrosive materials, but, at present, a silicate spray, cellulose acetate or glassine on the interior of the fibre container has been found to be satisfactory in a great many cases.

Fibre containers have recently been found satisfactory for holding hot liquids which solidify upon cooling, such as rosins, resins, waxes, asphalt, etc.

The packaging problem is, of course, complicated by the scarcity of material and affects not only the metal container but also a great many of the materials and compounds formerly used in the manufacture of fibre con-

tainers. Such standbys as waxes, animal glues and asphalt are increasingly hard to obtain.

This problem has called for a great deal of research on the part of fibre container manufacturers, manufacturers of protective coatings and allied interests, together with the fact that manufacturers in other lines of business are turning to fibre containers in the hope that they will be able to solve their packaging difficulties.

Each product brings up a specific problem. For example, a good percentage of milk today is packaged in fibre containers that have been dipped in waxy solutions which have been developed for milk only. Confections, such as cookies, formerly packaged in tins, are now packaged in cylindrical fibre containers.

The laminants in these containers must accomplish the following things: They must be non-toxic, have no odor which will be transmitted to the food and they must be moisture-vaporproof in order to preserve the freshness of the food. A special laminant has been developed to make the all-fibre container remarkably efficient as a substitute for the former container made of metal.

Sealers

Sealers must be waterproof, moisture-vaporproof and have high adhesive qualities. In some cases, sealers must be greaseproof, odorless and tasteless. These

4. 5-gal. all-fibre drum with cellulose acetate inner lining and asphalt-barrier board designed for munitions, drugs, chemicals and foods. Photo The Container Co.



specifications depend on the type of material packaged, as well as the ultimate use.

Some fibre containers are sealed with the regular laminant used in the manufacture of the container, using a water-soluble sealer, such as silicate of soda, for ordinary uses. A resinous adhesive is used for containers that are to be waterproof and moisture-vaporproof. After this is done, the ends of the container may be dipped in a mixture of rosin and wax. On the open end of the container a sealing disc is used to insure complete closure. This disc is usually made of kraft paper, impregnated with wax.

Listed below are some of the adhesive and protective materials used in the manufacture of fibre containers:

Laminants and adhesives

Water-Soluble

- Silicates
- Vegetable Glues
- Animal Glues

Water-Insoluble

- Waxes
- Asphalts
- Lacquers—solvent and emulsion types
- Resins—solvent and emulsion types

Chemically Resistant

- Resins

Linings

Chemicals {Solvent and Emulsion Types}

- Vinyl resins
- Phenol-formaldehyde
- Oleoresinous Varnishes
- Lacquers
- Silicates

Thermoplastics {Hot Melts}

- Waxes
- Paraffins
- Resins

Fabricated Materials

- Vegetable Parchments
- Greaseproof Papers
- Metal Foils
- Cellophane
- Rubber Hydrochloride
- Cellulose Acetate
- Ethyl Cellulose
- Glassine

Sealers

- Miscellaneous Cements
- Rubber Compounds
- Asphalt Cements
- Resinous Cements
- Pyroxylin Cements

Steel Drums

by R. W. Lahey

THE limitations which have been placed on the use of steel drums during the last year practically limit these containers for use in transporting materials for which no substitute packaging has been found. Limitation Order L-197, issued early last fall and revised on January 29, lists a total of 175 products and groups which cannot be transported in steel containers. In addition, allocation Order M-255 requires:

1. That priorities must be obtained before purchasing steel drums for transporting any product not prohibited by L-197 revised.
2. That after receiving a rating, this rating must be referred to the Containers Division and permission obtained to buy the drums in question.

These orders have resulted in savings of substantial tonnage of steel which doubtless has been diverted to uses more closely allied with war needs. In an effort to further this good work, this section of the 1943 PACKAGING CATALOG will be devoted to a discussion of further supplementing these steel savings.

Many types of single-trip steel drums used for transporting liquids, pastes and dry materials, although designed for one trip, have a ready second-hand value because there is considerable service left in them after the first trip. In the last year, most of the original purchasers of these containers have considered it necessary to maintain their ownership and thus use the drums for their entire life rather than for just the first trip. So the single trip containers have changed their status to returnable containers.

Because of the emergency, the Interstate Commerce Commission has empowered the Bureau of Explosives to grant permission to shippers to re-use single trip con-

tainers for the transportation of dangerous articles. The Bureau of Explosives will consider any written application of an individual shipper of these dangerous articles, provided the shipper agrees to retest the drums before each reshipment.

It is therefore logical that certain changes in construction of these drums should be made to better fit them for their changed role as returnable containers. If the life of these containers can be considerably extended by using a small additional quantity of steel in strengthening them, the total steel required will be reduced. This can be accomplished by adding protection to those parts of drums which receive the most abuse and which have to stand the most wear. Those features of the heavy returnable drums which have been used by industry for many years, and which have been added to protect them, may be adapted to these so-called "single trip" containers which are now in returnable service.

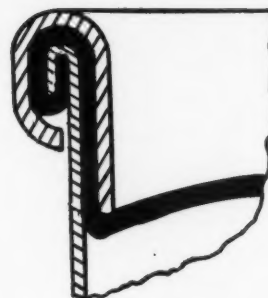
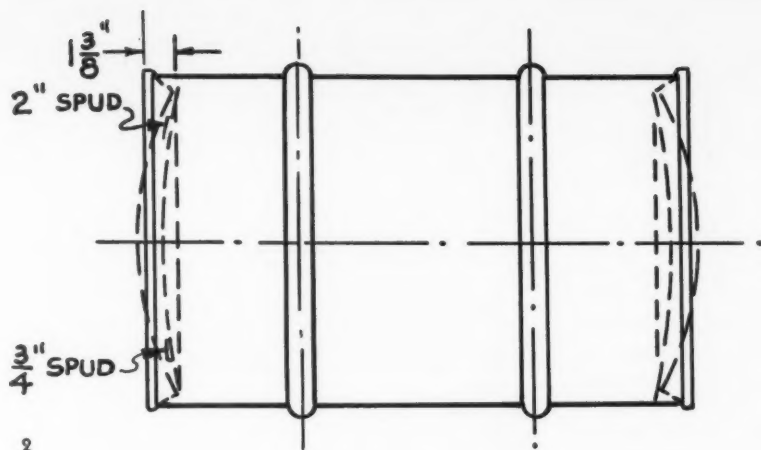
No one type of construction can be universally recommended for any type of drum because of the great variety of products that each kind carries. Ladings vary in weights from 300 lbs. to 850 lbs. of liquid in a 55-gal. drum. The physical and chemical characteristics such as viscosity, pH, and possible internal pressure cover wide ranges. That recommendation which best fits the needs of each product should therefore be chosen.

As there are several types of containers, each general classification must be considered separately, as follows:

A. Drums for Liquids (tight head). The 55-gal., 18-gauge drum with two small openings is the most popular type of all of the single trip containers. The construction changes which are discussed apply for the smaller sizes as well.



1. Increased practice of re-using steel drums calls for constant and repeated tests. Illustration shows air testing of metal drums. Photo Atlas Steel Barrel Corp.



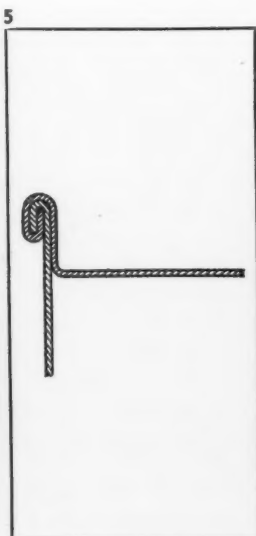
2. 55-gal. steel barrel; 18 gauge occugated shell with swedged hoops; 18 gauge head and bottom. Chime reinforced with 11 gauge reinforcing ring. 3. Detail of chime reinforcing ring. Photos Wheeling Steel Corp.

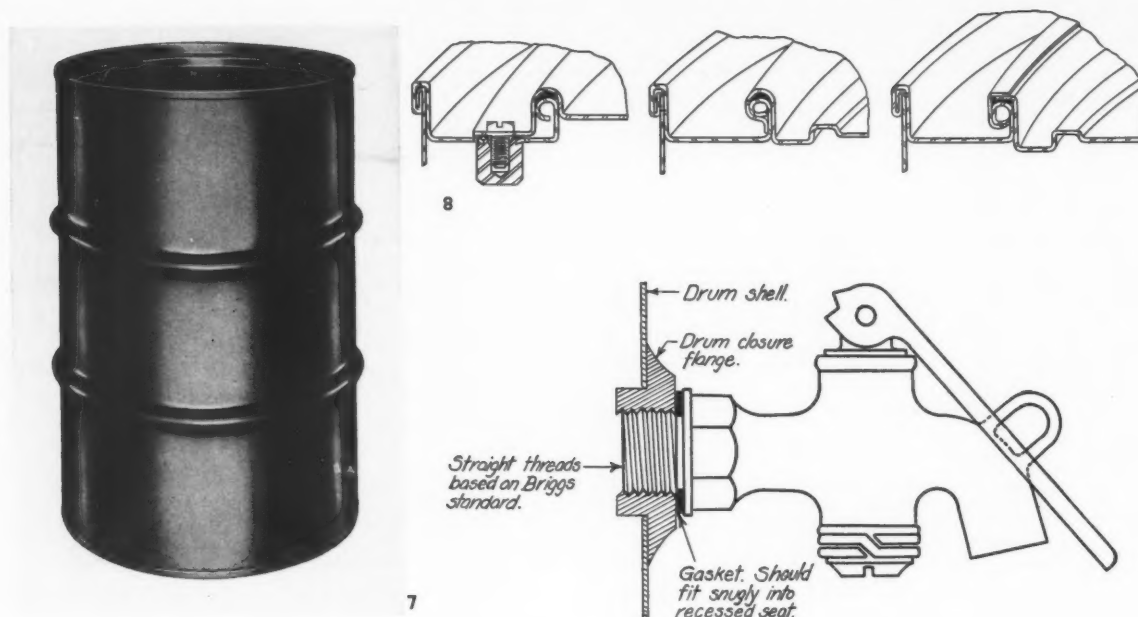
1. *Heads and chimes:* Heads are attached to the drum bodies or cylinders by double seaming, which consists of tightly interfolding mechanically five thicknesses of metal. Included in this seam is a sealing compound composed of rubber or glue to seal it against penetration of liquid through the folded seam. Bumps and rolling or moving on heads tend to loosen this seam which ultimately result in leaks.

This chime can be strengthened by the use of chime reinforcements of 11 or 12-gauge steel weighing about 10 lbs. per pair. Heads should be crowned to a minimum of $\frac{3}{4}$ in. to give added strength against abuse and more resistance to internal pressure. Heads of 16-gauge steel also add considerably to the strength of this container.

2. *Openings:* Standard openings are $\frac{3}{4}$ in. and 2 in. The threaded flanges are inserted mechanically by heavy presses. There are rubber gaskets between the flanges and the drum metal to prevent leakage at this joint. Plugs are often tightened and loosened from a minimum of six to more than 20 times during a round trip and often very heavy wrenches are used. The force used in opening and closing the plugs gradually weakens the joint which is held only by the stiffness of the metal itself. In fact, the use of excessive pressure may loosen this joint during the first few times the plug is removed and replaced. Returnable drums are constructed with welded flanges to prevent failures of the containers at this point. If possible, some form of spot welding or complete welding of the spuds should be adopted.

4. 55-gal., 18 gauge drum for transporting liquids. Note corrugation in cylinder, expanded rolling hoops and mechanically pressed openings. 5. Double-seam construction for locking heads and cylinders of metal drums. 6. Hackney seamless bilge barrel. Note locking head and smooth inner surface. Photo Pressed Steel Tank Co.





7. A 55-gal. drum made of 18-gauge steel, generally used for transporting pastes and semi-liquids. 8. Drawing which shows the construction of the bolted cover; center, shows the lug seal; right, the ring seal cover. 9. Lock faucet for dispensing contents of steel drums. Photo 7. Stevens Metal Products Co.

If a leak develops at the flange, it probably cannot be repaired. For this reason it is suggested that both openings be located in one head. Then when a leak at the opening develops it is possible to remove the head and replace with a new head. Of course the drum would be slightly reduced in capacity.

3. *Rolling hoops:* Hoops are formed by expanding cylinders—thus are of the same gauge and stiffness as the sidewalls of the containers. Heavy loads and constant rolling of the drums crush the expanded hoops until they approach the plane of the sidewalls of the drums.

There is little that can be done to prevent this, although the crushing may be retarded by increasing the height of the rolling hoops. Exporters have been using drums with hoops extending $\frac{7}{16}$ in. or less from the drum cylinder in order to save transportation charges. The $\frac{3}{4}$ -in. height is to be preferred for returnable drums. There are some contentions that a broad "U"-shaped hoop will resist crushing better than the sharp "V"-shaped type.

4. *Bodies or cylinders:* No changes are suggested for the bodies of these drums because they are protected by the hoops and head chimes and therefore are relatively stronger than the ends.

For some heavy products where containers must stand excessive transportation abuses, drums constructed of 16-gauge steel with chime reinforcements (I.C.C. Specification 5B) may prove to be the most economical. The ability of this construction to stand up under adverse conditions will more than offset the additional 24 lbs. of steel per drum required.

B. Open Head Drums: For heavy liquids, pastes, etc. These containers have full open heads which are attached to the drums by expanding steel rings. There is a gasket, usually of sponge rubber, placed in the cover at the chime.

1. *Open head.* The many times that drums are opened and closed require parts that are strong enough to resist this continual wear. If the chimes or the heads are distorted or bent, they cannot be closed leak-tight.

Heavy 11-gauge closing rings are recommended. These rings are closed by tightening with lever or with a bolt. The bolted ring with heavy $\frac{5}{8}$ -in. bolts will last longer and can be easily replaced if threads are stripped. Lugs used to hold the bolts to the rings should be made from drop forgings of the same heavy gauge.

Heads of 16-gauge will provide additional stiffness and strength.

2. *Bottom.* The recommendations for the heads of tight head drums in "A" apply.

3. *Rolling hoops.* In addition to the suggestions in "A" a third rolling hoop immediately below the top chime will help to protect the closing ring and bolt from damage.

4. *Lined drums.* Certain products must be kept from contact with steel. Drums for these products are lined with various types of lacquers, etc., which usually will not last as long as the drums. If open head drums are used they can be sand-blasted to remove the old lining and provide a rough surface for the new lining to cling to. There are not many drum reconditioners who have sand-blasting equipment and ovens for baking lacquers,



10



11

10 and 11. Full open headed 55-gal. Quiklox drum with ring and lever closure. This 18-gauge steel drum is usually used as a single container.

but this is the only known successful method of relining drums up to the present.

C. Light Gauge Drums for Dry Materials. This type container includes drums fabricated of 18-gauge to 30-gauge steel with openings varying from small friction covers to full open heads.

1. *Side or cylindrical seams.* Hook seams and Gordon Lock seams are mechanically folded or pressed. The lap-welded seams will last much longer and at the same time less metal is required.

2. *Heads or ends.* Unless these drums are made of 20-gauge or heavier metal, use of chime reinforcements are not recommended. Heads of steel, two gauges heavier than bodies, may provide added service.

3. *Openings.* Drums fabricated of steel lighter than 20-gauge should not be of the open-head type. The

smallest opening practical should be used and it should be in the form of a friction lid, secured with channel clips or turnbuckles. These lids should not be reamed or they cannot be re-used.

4. *Sidewalls.* The use of corrugations will stiffen the sides and resist denting better than the straight walls.

Entirely apart from considerations of construction is the possibility of saving steel by making drums last longer as a result of proper care. Not only should the drum shipper be sure that proper storing, handling, reconditioning and shipping methods are used at the filling plants, but specific instructions for proper emptying, storage, etc., should be given to all customers. Instances of improper handling should be brought to the customers' attention and proper steps taken to prevent recurrence of the abuses.

A. Storage. Drums should be kept under cover in a dry, clean area. All openings should be tightly closed to prevent interior corrosion. Outside surfaces should be painted. Drums should be stored on their heads and dunnage used between tiers.

If it is necessary to store out-of-doors, drums should be placed on their sides, resting on 4 in. \times 4 in. timbers with side openings (if any) down. This type of storage will shed water and allow passage of air under drums, thereby preventing dampness and minimizing corrosion. If lack of space requires tiering, two 2 \times 4 timbers should be placed between each tier located between the rolling hoops and chimes. A tarpaulin cover will provide worthwhile protection.

B. Handling. Drums should always be moved by rolling on their sides to prevent head distortion. The use of hand trucks designed for the purpose is recommended. Never lower drums by dropping—they should be eased down skids or inclined runways.

C. Reconditioning. Drums should be inspected as soon as returned. They should be cleaned promptly, necessary repairs made, they should be repainted and placed in dry storage with all openings tightly closed.

D. Instructions to Customers. The following should be included on labels or other forms of instructions sent to customers:

1. Use straight threaded faucets or spigots for emptying. Tapered threaded emptying devices will tear out bungs, distort or even strip the threads.
2. Do not contaminate drums by filling with any other material.
3. When empty, do not clean or rinse but close openings tightly.
4. Drums should not be dropped. Lower from platforms or trucks by easing down inclined runways or skids.
5. If inside storage is not available, store on 4 \times 4 timbers off the ground on their sides with side openings down.
6. Return promptly.

These instructions for customers employees should be contained on labels pasted on drums and supplemented by posters to be displayed on bulletin boards, walls or doors.

Linings for Metal Containers

by Elon R. Brown

FOR years it was necessary to package certain materials in glass or wood containers because of the reaction of these materials to the steel, tinplate or terneplate containers. Special linings have opened up new uses for steel containers in this field. Continuing research has overcome many of the handicaps and is improving those linings already developed.

Generally speaking, linings for steel containers are designed to protect the contents of a container from contamination or discoloration by the steel, rather than protect the container from the action of the materials packaged. In some cases, however, the lining must protect the container from the corrosive action of the contents in addition to safeguarding the packaged material.

Specific problems frequently introduce special considerations, and resistance tests are necessary to determine whether or not linings meet particular requirements. In some cases, experience has shown that two coats of lining are necessary for proper protection. Different types of linings designed for specific purposes assure

adequate protection and eliminate dangers of contamination. The war has brought many new problems for the packaging industry to solve.

Steel containers for war

One of the major problems today is the manufacture of metal containers for war materials. The protective coatings and linings for these containers must be designed to withstand far more than ordinary abuse and to stand up under many conditions for which they were not originally intended. For example:

The 5-Gallon Expeditionary Water Can is a rectangular container, with handles welded to the top and a filler plug in the upper corner. The body of the container is welded with double-seamed bottom. The organic lining lacquer used inside this container must be of the highest quality to prevent water contamination, as most ordinary lacquers give a foul flavor to the water. These containers are handled roughly, often being dropped from a truck or plane. As a result, the lining must resist cracking or flaking when the container is dented. Quite often Army personnel use these containers for making coffee or lemonade, so the lining must withstand these reactions and still protect the steel container against rusting and corrosion.

The Expeditionary Gasoline Can is made exactly like the expeditionary water can, the only difference being in the protective lining. The lining is a one-coat, baked-on system designed to be unaffected by high octane gasoline and yet will protect the inside of the container against rusting, corrosion and rough handling.

The Desert Water Can was designed to be carried at his side by a soldier. This container is made of light steel and fitted with carrying straps. The container holds about 3 gallons and is so shaped as to rest easily on the soldier's side. The lining lacquer used in this container is composed of a two-coat system—first a primer is applied to the metal in the flat before fabrication and then a finish coat is sprayed over the completely fabricated container, inside and out. This lacquer lining system is similar to that used in the expeditionary water can.

The Decontamination Can is a double-compartment container designed to package bleaching powder above and organic liquid below. Mixed together, these produce a decontaminating liquid used to renovate "gassed" areas, clothing, shoes, etc.

Two different finishing systems are required. A two-coat system is used for the top container and inside of the cover, and a one-coat system is used for the bottom container and bottom of the top container. The United States Army Specifications for decontamination cans calls for a lining lacquer in the top compartment to withstand one per cent chlorine solution for 96 hrs. at 70° F. The

U. S. Navy packages as seen at the AMA Packaging Conference, April 1943. Note various metal containers, all of which have interior and exterior coatings for protective purposes.



requirements for the bottom container lining specify that the lacquer be unaffected after refluxing for 2 hrs. in the organic liquid packaged in the bottom compartment.

The outside of this container is finished with Warm Drab Enamel as shown on the United States Army Color Card 3-1.

The Bleach Drum is made of steel and is similar to a 15-gal. drum in size. Because of the fact that the bleaching powder packaged in the drum contains chlorine, a satisfactory lining lacquer is essential because chlorine attacks iron or steel, especially in the presence of moisture when hydrochloric acid is formed. To protect against this, the bleaching powder is kept as dry as possible and a specially designed high-grade lining lacquer is sprayed throughout the interior of the container and cover, then thoroughly baked on. The requirements of this lacquer are listed under United States Army Specifications relating to bleach drums. The outside of this container is finished with lustreless blue grey enamel to match United States Army Color Card 3-1.

The 30-Calibre Ammunition Case is welded and double seamed from heavy gauge metal and designed to hold one round of 30-cal. shells and the clips and belt as one unit. Inasmuch as this container is also made of steel, a protective coating is required for inside and outside. Therefore each container is dipped into a lustreless olive drab enamel which is especially designed under United States Army Specification ES680 Class 4. After dipping, the case is carefully drained and thoroughly baked under infra-red heating equipment. This process results in a tough, durable coating over the entire box, cover and fittings.

Steel container linings for peacetime uses

For normal peacetime uses different types of linings are recommended for individual products. Obviously there is a considerable difference among various substances in their susceptibility to contamination. Some products require a more resistant lining than others, and in certain cases experience has proved that two coats are desirable. There are a great many different types of linings, but in the following charts only the five linings described below are represented, illustrating different problems and considerations. These linings, originally designed for civilian use, are equally effective on war materials.

Type A—This lining is used for some of the more corrosive products formerly packaged in wood or glass. The coating consists of a phenolic base resin with suitable fillers for a primer and a specific type of phenolic resin for the top coat. This two-coat system represents the highest degree of protection in container linings against the greatest variety of products.

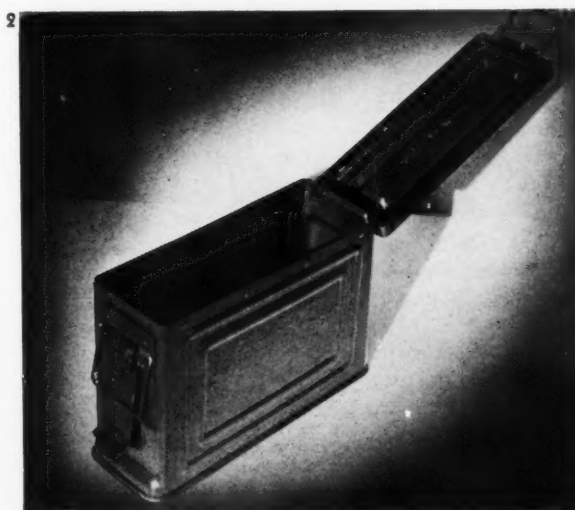
The two-coat system is relatively expensive, not only because of the fact that two coats are applied, but because the coverage in a pigmented prime coat is necessarily low. This system is recommended only where manufacturers have been unable to accomplish satisfactory protection with less expensive materials.

Type B—When this lining is properly applied and baked, it becomes hard and glass-like. This is a phenolic

type lining insoluble in all known solvents. It is, therefore, especially useful as a lining for packaging such strong solvents as alcohol, chloroform, acetone, varnish remover, nitrocellulose lacquer, thinners, etc. This lining is recommended as a sanitary lining for steel beer barrels and is used extensively in this field.

Drums protected with this lining properly baked and aerated are absolutely free from oleoresinous paint and lacquer odor, and smell much sweeter than a plain steel drum. In containers intended for use where extraordinary protection and complete coverage are required, two, three or even four coat work may be done.

Type C—This lining is being used extensively in containers for edible fats. It is of the same general composition as Type B, but sells at a somewhat lower price and is



2. Metal container for 30-calibre ammunition with inside and outside coating. 3. 5-gal. metal container with resinous inner lining to package drugs, chemicals, munitions and foods. Note crimped closure. Photo The Container Co.

slightly less effective than Type B in the matter of resistance to the action of corrosive chemicals. Like Type B, it is a modified phenolic base, insoluble in all known solvents. As in the case of Type B, drums protected with this lining, appropriately baked and aerated, are free from oleoresinous paint and lacquer odor. More than one coat work is not recommended with this lining. Where greater protection is required, the use of Type B is recommended.

Type D—This lining is suitable for drums intended to contain edible oils, lubricating oils, greases, industrial and transformer oils. It is a very high-grade lining of the synthetic oleoresinous type, and is the most widely used lining on the market for hydrogenated edible oil products, such as Crisco, Primex, Snow-Drift, Spry and similar substances.

Empty drums recently lined with Type D show a mild odor which is not transmitted as an extraneous odor or flavor to materials packaged. For this reason, and because of its greater flexibility, a number of manufacturers of edible hydrogenated products prefer this lining to Type B or Type C.

Type E—This lining is recommended for use in connection with hydrogenated edible oils. It is of the same general character as Type D, but is of an oleoresinous type of a somewhat lower quality, compounded primarily to meet requirements for a lower-priced product. It has been approved for hydrogenated oils and other edible products. Where competition is keen and the container is definitely a one-time shipper, there is a market for a lining of this type.

All of the aforementioned linings should be sprayed over carefully cleaned steel and then force-dried by an increasing heat from room temperature to 400 or 425° F. during a twenty-five minute cycle. When more than one coat is applied, only the final coat should be baked as above. Preliminary coats should be baked in the neighborhood of 250 to 275° F.

Following are charts indicating the type of linings recommended for individual products. The numerals indicate the number of protective coatings of each type that is required.

Animal and Vegetable—Oils and Fatty Acids

	Type A	Type B	Type C	Type D	Type E
ACL (Stearic Acid Chloride)	1	1	1		
ADM No. 100 Oil	1	1	1		
AM Coco (Fatty Acid Derivative)	1	1			
AM Coco B (Fatty Acid Derivative)	1	1			
AM 1181 (Fatty Acid Derivative)	1	1	1		
Castor Oil	1	1	1	1	1
Castor Oil Fatty Acids	1	2			
China Wood Oil	1	1	1	1	1
Essential Oils	1	1			
Fatty Acids of Drying Oils	1	2			
Fish Oil	1	1	1	1	1
Fish Oil Fatty Acids	1	2			
K-1170 (Fatty Acid Derivative)	1	1	1	1	
Linseed Oil	1	1	1	1	1
Linseed Oil Fatty Acids	1	2			
N Coco (Fatty Acid Derivative)	1	1	1		
Oleic Acid	1	2			
Perilla Oil	1	1	1	1	1
Pine Oil	1	1	1	1	1

Food Products

	Type A	Type B	Type C	Type D	Type E
Amaizo (Edible Lactic Acid)	1				
Beer	1	2			
Butter	1	1	1	1	1
Cane Syrup	1	1	1	1	1
Caramel Coloring	1	1	1	1	1
Chocolate Drink Syrup	1	1			
Cola Concentrates	1	2			
Condensed Milk	1	2			
Diamalt	1	2			
Evaporated Milk	1	2			
Hydrogenated Edible Oils	1	1	1	1	1
Karo Syrup	1	1	1	1	1
Lard	1	1	1	1	1
Margarines	1	1	1	1	1
Soft Drink Concentrates	1	1			
Sorghum Molasses	1	1			
Sugar Syrup	1	1	1	1	1
Vitamin Solution "B"	1	2			

Products of Oil Refiners

	Type A	Type B	Type C	Type D	Type E
Base Oil "A"	1	1	1	1	1
Gasoline	1	1	1		
Grease (Lubricating)	1	1	1	1	1
Hydrogenated Naphtha	1	1	1	1	
Hydrocarbon Solvents	1	1	1	1	
Industrial Oils	1	1	1	1	1
Kerosene	1	1	1		
Lubricating Compounds	1	1	1	1	1
Lubricating Oils	1	1	1	1	1
Mineral Spirits	1	1	1	1	
Nujol	1	1	1	1	
Petroleum Ether	1	1	1		
Petroleum Jelly	1	1	1	1	
Petroleum Solvents	1	1	1	1	
Transformer Oils	1	1	1	1	

Strong Solvents—Coal Tar and Miscellaneous

	Type A	Type B	Type C	Type D	Type E
Acetone	1	1	1		
Amyl Acetate	1	1	1		
Amyl Alcohol	1	1	1		
Ansol	1	1	1	1	
Benzol	1	1	1		
Butyl Acetate	1	1	1		
Butyl Alcohol	1	1	1	1	
Butyl Lactate	1	1			
Denatured Alcohol	1	1	1	1	
Dibutyl Phthalate	1	1	1		
Ether (Sulphuric)	1	1			
Ethyl Acetate	1	1			
Ethyl Alcohol	1	1	1	1	
Lacquer Thinners	1	1			
Lacquer (Nitro)	1	2			
Propylene Dichloride	1	1	1		
Toluol	1	1	1	1	
Tricresyl Phosphate	1	1	1	1	
Turpentine	1	2			
Xylos	1	1	1	1	

Miscellaneous

	Type A	Type B	Type C	Type D	Type E
Arcolene Soap (Dry Cleaning)	1	1			
Basic Casein Emulsion	1	2			
Formaldehyde (40% Aqueous)	1	2			
Green Oil Soap (40% Aqueous)	1	2			
Glycerin	1	1			
Lav-O-Let (Creosote)	1				
Magnesium Hydrate 30%	1	2			
Paint Products	1	2			
Putty Products	1	1			
No. 600 KOP Soap (Dry Cleaning)	1	2			
Sohio Soap	1	2			
Urea Formaldehyde Resins	1	1	1		
Varnish Products	1	2	1	1	
Witch Hazel	1	2			
Wood Pulp Lactic Acid	1	2			
Yellow Pulp Color	1				
Zinc Chloride (70%)	1	1			

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Wooden Barrels

AS A result of the effort to find substitutes for steel containers, the wooden barrel is staging a comeback. Although a 50-gal. wooden barrel weighs 72 lb. (as compared with the 51-lb. weight of a 55-gal. 18-gauge steel barrel) and in spite of the somewhat higher cost and greater shipping space required, the wooden barrel is much in demand because there simply isn't enough steel to make the required number of drums.

The wooden barrel goes back to the ancient Roman times when, of course, it was strictly hand made. Today its machine-made successor is very little different. There is a shortage of skilled labor in the cooperage trade, as well as a lack of cured wood ready for staves. Estimates in the cooperage industry indicate a possible production of 6,000,000 barrels a year. If labor and lumber are provided, and if steel hoops are permitted, production might be stepped up to 15,000,000 as the possible output of the some 350 makers of barrels, kegs, tubs and hogsheads in the United States.

Though the structure of the modern barrel remains the same, improvements have taken place in the use of linings and coatings. One consists of a weatherproof coating with an asphalt base, which, it is claimed, will withstand heat, cold, dryness and moisture without causing swelling or shrinking of the wood, slacking of

the hoops, warping of heads or opening of joints. It is recommended for export shipments.

Another modern touch provides barrels with metal flanges and plugs, one 2-in. and one 3/4-in. in one head of each barrel. These make it possible to siphon out the contents by the same method as used with steel drums, thus making the wooden barrel more adaptable for reuse. It is possible to vary the inside coatings so that different contents may be carried.

The revival of cooperage means that American shippers must learn all over again how to use barrels—particularly essential now in view of the shortages which necessitate longer life for all containers. Pointers for the handling of barrels include the following:

1. Roll the barrel on its "bilge" or side, never roll it "hand-over-hand" on end.
2. "Ease" barrels gently down the skids.
3. Avoid rough handling—wood can't take it as steel can.
4. Don't expose barrels too long to the sun—they'll dry and shrink.
5. Barrels should not be stacked tier on tier.
6. Use hooks carefully.
7. In loading for export shipment, use chime hooks or rope slings, not loading nets.

Left. In first World War 95 per cent of petroleum products were shipped in wood barrels. Right. Cooperage industry is working to capacity to produce barrels for domestic shipments and export to South America. Bottleneck, however, is shortage of skilled labor and cured wood for staves.



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Protective Pads and Cushions

JUST as there is a wide range of types of shipping containers and packages to choose from, so there is a wide range of types of protective pads and cushions available to the packing engineer. The same general rules apply in the selection and design of interior packing protection as apply in the selection and design of the shipping container.

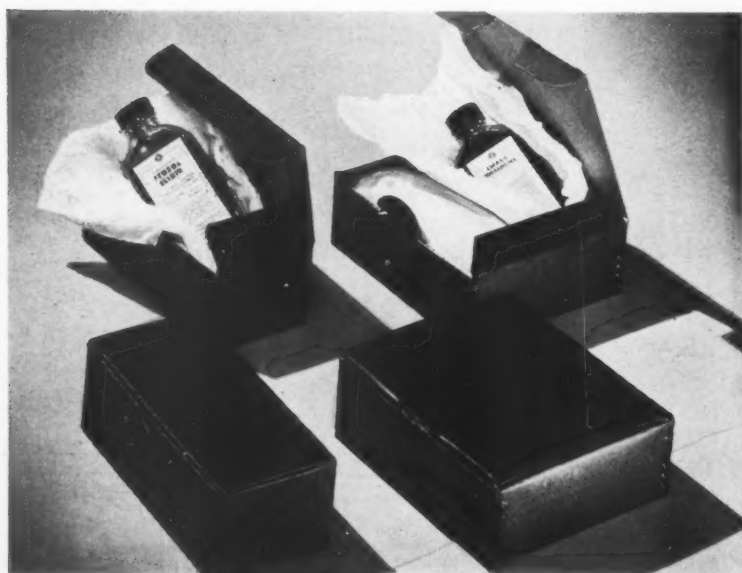
Simply stated, the material that will best perform the function of product protection at the lowest cost is the obvious material to employ. It is equally obvious that the matter of performance comes first in importance—cost second. All types of interior packing pads and cushions, sheets and wraps, from the corrugated board air pad to the excelsior pad, from loose excelsior, wood wool and shredded tissue to the softer paddings such as cotton, felt and, more recently, creped wadding—all have their logical places in the packaging picture.

Creped wadding has made steady progress in its general adoption as a staple product in the packing field. It has many natural advantages. It is soft, clean, flexible, cushiony, easily cut and handled, available in many convenient forms, sheets, pads, rolls, in various thicknesses and with various backing materials. Because of its ready adaptability to the common-place as well as to the unusual packing problem, it contributes to speeding up the operation of packing and cuts costs on many jobs where formerly baser types of packing materials have been used. In effect, all packaging is the means of protecting products from some form of damage while in transit or storage on the way to or awaiting the time of use. The ultimate user has need of and has become accus-

tomed to delivery of the products he buys in factory condition.

As products, new and old, are freshly packaged, new problems of protection arise. Almost all products need some interior protection other than a cleverly designed carton. Most carton designers recognize that and today they keep well supplied with and informed as to accessory materials, such as interior paddings, wraps and cushions of a protective nature. Among the many interesting examples of products customarily using creped wadding for protection packing are: graded Michigan apples, artificial flowers, cake ornaments, fluorescent lighting fixtures, abrasives, rolls of metal foil, switchboard panels, electronic tubes, airplane and gun control instruments, airplane fuselage parts (such as wing ends, tails, struts, ailerons, etc.), flat silverware, polaroid glass, filters for color photography, artists' crayons, bar candy in wholesale containers, sheets of stainless steel, microphones, thermometers, advertising displays, box labels, transparent packages, transparent plastic sheeting.

Generally the need of interior packing protection is due to the fragility of the product's finish. Finishes of all types—varnish, lacquer, enamel, porcelain—are used primarily to protect the product itself from wear, moisture, stain, chemical and physical changes. Some finishes provide beauty of the product while protecting it; others merely preserve this beauty and add nothing to its eye-appeal. Paradoxically, these protective finishes themselves need protection. That is the function of protective pads and cushions. The thickness and size of protective pads or cushions are determined by a number



1. Smith, Kline and French pharmaceuticals are sampled to physicians safe from breakage by heavy cushions of absorbent creped wadding.

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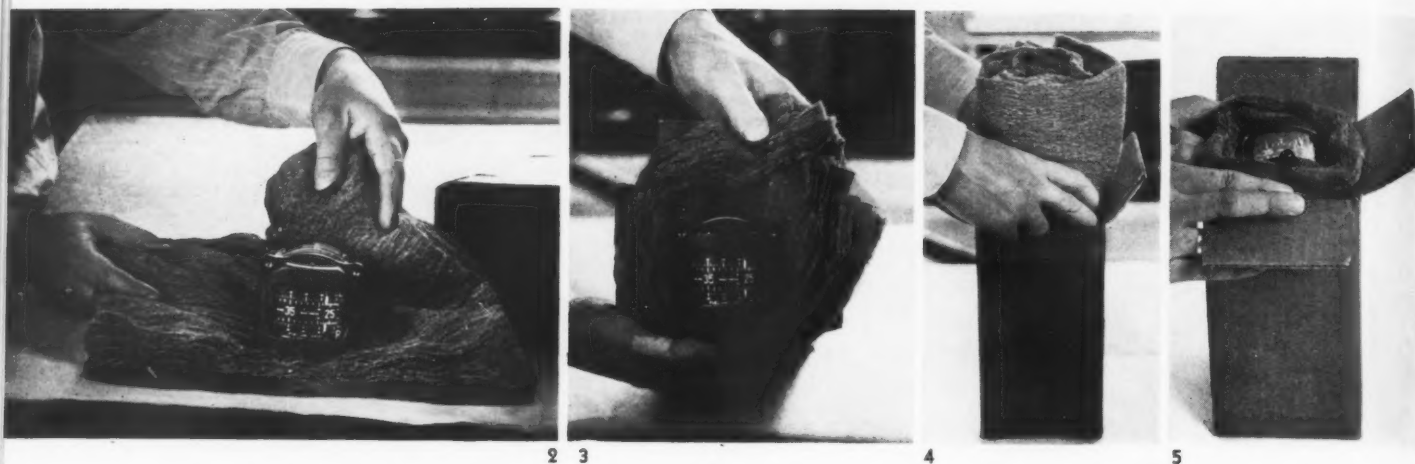


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For the packaging "freshman" or "senior" these "text-booklets" are invaluable. They analyse packaging problems, present the solutions. You'll save many headaches and hundreds of dollars by having a set handy for reference. Write for it today.





Four steps in the packing of an Aero Mixture Indicator Unit, an important aviation instrument, manufactured by Cambridge Instrument Co., Brooklyn, N.Y.: 2. Square pads of 1-in. thick creped wadding are used. 3. The instrument is carefully wrapped with wadding evenly distributed. 4. Wrapped instrument is inserted into tight-fitting corrugated shipping container. 5. Instrument is now suspended in a deep cushion of shock-absorbing wadding and is fully protected against all shocks received in transit.

of considerations: the nature of the product, the weight, protection of finish or structure, the type of packing container, the nature of the journey, and the method of handling or warehousing.

In some cases the packing material is employed as a contact pad in conjunction with rigid interior packing for facing of corrugated pads or wood bracing members of wooden containers. In other cases it is applied in sheet form to cover wide areas of finished surface as a cushion protection from direct contact with the walls of corrugated or fibre containers. In others, particularly in the packing of small fragile articles, or in parcel post packing of liquids, it is used in thick blankets to swathe the product completely in a resilient cushion.

Used as a buffer between product finish and side or member of packing container, creped wadding provides the four essentials of a packing protection material:

- 1) Cushion to equalize the irregularities of the two opposing surfaces and thus eliminate press marking;
- 2) Reduction of surface "burning" through absorption within the padding of vibration in transit.
- 3) Surface smoothness that increases with pressure to reduce further hazard of "burning."
- 4) Conformability to surface, which prevents cinders or other gritty substances from becoming imbedded between finish and container walls.

Not so many years ago internal packing materials were given but little attention. They were considered necessary evils, avoided where possible and used only as a last minute necessity.

The functions of interior protective packing design and materials used for the prevention of transit damage may be stated generally as:

- 1) Absorbing shocks transmitted to the product either from external blows received by the container or by concussion with each other when several prod-

ucts are packed in the container.

- 2) Absorbing continuous vibration which all containers are subject to in transit and which would be transmitted directly, with damaging effect, to the finish of the packed product.

- 3) Absorbing liquids from broken bottles or from leaking closures.

Eye-appeal in packaging naturally plays a most important role as a sales-display factor with certain consumer products of the luxury class of which cosmetics, confectionery, candles are examples—products that vie with each other for consumer attention in dressed up packages. Like all other important manufacturing operations, packaging of mass production items long ago progressed to the stage of engineering design and is now in the domain of the skilled technician. Because such packaging is a practical art, the factor of utility at all times governs the selection of materials employed.

In all packing design the engineer is governed by a great many considerations, including size, shape and weight of product, the construction and finish of the product, how many units must be packed in the container, cost allowance, handling, storage and transportation conditions, etc. He must then determine the type of container available and suited for the job. He chooses from solid wood boxes, wood crates, cleated fibre, solid fibre, corrugated board, etc. Equally important with the type of container is the method of interior packing to be employed. Here again he has a fairly wide choice, but the general divisions are simplified into the three methods employing internal protection materials:

Compression packing: Where the product is completely protected on one or more (in some cases all) surfaces with thick cushions of protective packing material that hold the product in place, prevent contact with other products within the container, prevent its contact



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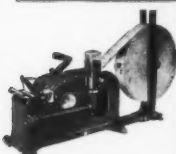
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Cloth Tape Model



BETTER-PAC
2 Length Repeater

BETTER-PAC
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Acme Steelstrappers SPEED STRAPPING APPLICATIONS



Acme Steelstrappers are the fastest automatically seal-fed strapping tools yet developed. This equipment tensions, seals and cuts the strap with a single stroke of two levers!

Together with Acme Steelstrap (which meets all Federal Strapping Specifications), Acme Steelstrappers are assuring faster and exceptionally low strapping costs. Acme Steelstrap is used to reinforce all types of shipments, both domestic and overseas...

cartons, boxes (wooden or fibre), crates, bundles and skids. Smaller packages can be bundled into single units with Acme Steelstrap to speed up handling... prevent loss and pilferage... reduce express charges. On large packs Acme Steelstrap reinforcements save time and material... permit additional economies by reducing weight.

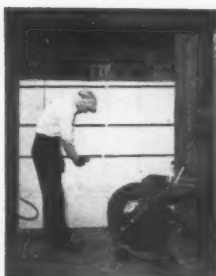
ACME TOOLS AND ACCESSORIES

Acme tools and accessories speedily apply Steelstrap to the entire range of shipping packs. Precision machined and constructed, Acme equipment is built for service and is easily operated. There is a type for every strapping job. The one best suited for your needs is determined by the nature of the item strapped and by conditions under which products are packed.

ACME STEELSTRAP MEETS ALL FEDERAL STRAPPING SPECIFICATIONS

ACME Unit-Load BANDS

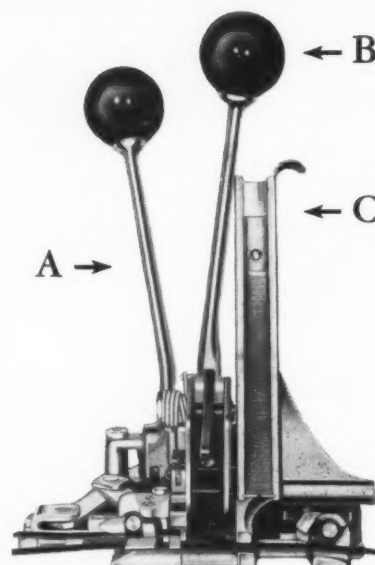
FOR CARLOAD AND L. C. L. SHIPMENTS



The Acme Unit-Load Process is a quickly applied and inexpensive flat steel band method of bracing carload freight... straight and mixed loads... car doors... pool and stopover cars. Hundreds of shippers have taken advantage of Unit-Load benefits to step-up shipments as well as to make important savings.

Shipments are made "Bound to Get There"... held in the grip of strong steel bands... securely tensioned and sealed around units of freight. When cars are braced with Acme Unit-Load Bands, it takes only one snip of each strap to easily and quickly remove the lading.

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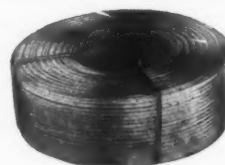
This tool is only one of the many Acme Steelstrap tools and accessories which comprise the most complete line of strap-applying equipment available.

- (A) One stroke of this lever tensions the strap and automatically feeds a seal into the sealer jaws.
- (B) One stroke of this lever seals the joint and automatically cuts the strap from the coil.
- (C) This magazine holds 100 seals... saves the time required to feed 100 seals by hand.

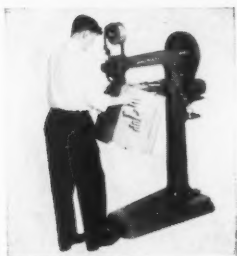
ACME SilverStitch

FOR SPEED AND ECONOMY IN STAPLING

Stapling is faster—more boxes can be stitched per day with Acme Silverstitch Stitching Wire. Uniform in temper, width and thickness. There are fewer stops for coil changes as Acme Silverstitch is supplied in *one piece*—five and ten-pound coils. Acme Silverstitch is rust-resisting... assures extra strong stitches that clinch and stay tight... and Silverstitch is packaged for your convenience.



ACME SilverStitchers NEW, FAST, ECONOMICAL —CARTON STITCHERS



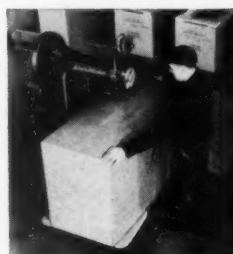
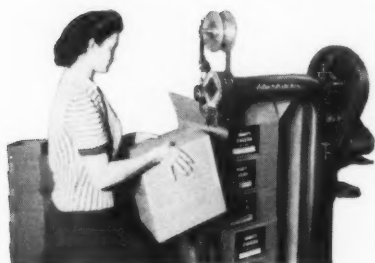
By using Acme Silverstitchers for carton stitching to replace old-time sealing methods, savings up to 50% in time and material are often effected. Production of stitched cartons is materially increased. Acme Silverstitchers assure a stronger carton because sealing by stitching has greater holding power... a better and neater job is provided. Teamed with Acme Silverstitch to function as a unit, Acme Silverstitchers give stitching satisfaction year after year.

AVAILABLE IN STANDARD AND SPECIAL TYPES:

The Straight Arm Silverstitcher is a heavy duty stitcher designed for fast stitching of sides and ends of many types of packs. The Bottom Silverstitcher is designed for low-cost, smooth, positive bottom stitching. Combining the straight arm and bottom stitching units in one machine, the Combination Silverstitcher is the all-around stitching equipment. Seam, top and stitchers for special applications are also available.



Combination Silverstitchers



Bottom Silverstitchers



Straight Arm Silverstitchers

ACME SilverStitcher FEATURES

Adjustable single pedal control • Few moving parts mean lower maintenance costs • Vital parts are reversible • Low power consumption • Heavy duty construction for long service • Silent V belt drive • Wide, comfortable foot-rest treadle • Resilient one-piece feed wheels • Handles two gauges of Silverstitch without adjustment • Conveniently placed starting and stopping toggle safety switch • Overfeed with adjustable spring tension and unique wire friction

plug provide constant and even flow of wire • Extra long life of main drive anti-friction bearing assured by use of genuine Promet bronze • Mechanism guarded for maximum safety • Individual parts are precision made and are interchangeable • Friction brake spring maintains continual pressure on clutch hub and simplifies brake adjustments • Easy to operate... runs smoothly and quietly • Efficient... Modern • Economical • Guaranteed.

ACME SilverStitcher SPECIFICATIONS

STRAIGHT ARM SILVERSTITCHERS are available in four throat sizes—12", 20", 25" and 30". These figures indicate the maximum carton depths which can be accommodated and represent the distance between the front of the frame and the clinching point. The size required is determined by the depth of the container or the nature of the article to be stitched.

Distance from floor to top of arm (clinching point): On 12" size—44"; on 20" size—46"; on 25" size—46"; on 30" size—48".
Distance from top of base to top of arm (clinching point): On 12" size—40"; on 20" size—42"; on 25" size—42"; on 30" size—44".

Sizes of Silverstitch used—all standard sizes which include .014, .017, .020, .023; .060 x .024 and .060 x .0205.

Width of crown of standard staples: On 12" size—7/16"; on 20", 25" and 30" sizes—1/2".

Motor: 1/4 HP single-phase long hour duty; 110-220 volt, 60 cycle, A. C. Other voltage, current and phase required, available at slight additional cost.

Speed: Depending upon application and dexterity of operator, speed is set before leaving factory at any one of the following approximate number of staples per minute—170, 200, 230, 260 and 285. If speed is not specified, stitcher is set for about 230 staples per minute.

Diameter of silent action V belt driving pulley... 14".
Floor space required:

On 12" size—20" x 30"; on 20" size—22" x 48"; 25" size—24" x 44"; on 30" size—22" x 50".

BOTTOM SILVERSTITCHERS are available in three throat sizes—12", 20" and 25". These figures represent the distance

between the front of the frame and the clinching point in stitching position.

Maximum dimensions of packs handled on 12" size—24" x 24" x 40".

Maximum dimensions of packs handled on 20" size—40" x 40" x 42"; on 25" size—50" x 50" x 42".

Distance from floor to top of arm (clinching point): On 12" size—44"; on 20" size—46"; on 25" size—46".

Distance from top of base to top of arm (clinching point): On 12" size—40"; on 20" size—42"; on 25" size—42".

Sizes of Silverstitch used—all standard sizes which include .014, .017, .020, .023; .060 x .024 and .060 x .0205.

Width of crown of standard staple... 1/2"

Motor: 1/4 HP single-phase long hour duty; 110-220 volt, 60 cycle, A. C. Other voltage, current and phase required, available at slight additional cost.

Speed: Depending upon application and dexterity of operator, speed is set between 185 to 300 staples per minute. For a small added charge an adjustable variable speed attachment can be furnished. This will handle the complete range mentioned above.

Diameter of silent action V belt driving pulley... 14".

Floor space required:

On 12" size—20" x 38"; on 20" size—22" x 48"; on 25" size—24" x 52".

COMBINATION SILVERSTITCHERS are available in three throat sizes—12", 20" and 25".

Width of crown of standard staple—1/2". Other specifications same as those above.



6. Selected Michigan Apples, easily bruised, are protected by a thick blanket of creped wadding in this gift box of Hill Top Orchards, Hartford, Michigan.

with the inside walls of the container, absorb shock and vibration in transit, handling, storage, prevent breakage and surface damage.

Suspension packing: Where the product is suspended by bolting or is otherwise anchored to one interior wall of the container so that it is free from contact with all other walls. In some cases, protection padding of appropriate thickness is located at emergency points of contact with braces or internal framing members of wood containers or other type containers.

Combination compression-suspension packing: Where the product is protected on one or more or all surfaces by a thin sheet or wrap or protective padding, or where contact pads are placed on the braces or framing members to prevent direct contact of finish with the inner walls of the container so that rubbing and press-marking of finish is eliminated. For many such containers the design favors lightness with strength, but the product packed is depended on to supply more or less of the rigidity of the package. The function of the protective packing material in such cases is to distribute so far as possible the weight of the contacting wall or brace or member over the greatest area.

Sealing Cases with Paper Tape

by M. W. Waggoner

BEFORE gummed paper tape as a means of sealing shipping cases reached its present stage of usefulness and popularity, three obstacles had to be overcome. One: freight, express and postal approval. Two: a uniform quality of gummed tape. Three: proper moistening which would form an inseparable bond between tape and container. Today this method has the "green light" on all three "tracks."

Regulations and rulings

Freight—Section 4 (a) Consolidated Freight Classification Rule 41 approves 60-lb. kraft tape for sealing cartons provided the strip is 2 in. or more in width, and that the ends overlap $2\frac{1}{2}$ in.

Express—Rule 18 (c) of the Official Express Classification approves 60-lb. kraft tape for sealing cartons provided the strip is 2 in. or more in width, and ends overlap in various lengths, depending upon whether the inner flaps are more or less than 6 in. apart.

Parcel Post—Postmaster General's Order No. 6821, dated December 7, 1921, amending Paragraph 5, Section 469, Postal Laws and Regulations, approves gummed tape sealing of packages for domestic third or fourth class mail (Parcel Post) provided the parcel carries a printed label which shows the nature of the contents and name of the manufacturer, producer or shipper. The

parcel is to carry the endorsement: "Postmaster—this parcel may be opened for postal inspection if necessary." The three standard weights of No. 1 kraft sealing tape under Practice Recommendation No. R114-30 of the Department of Commerce are 35, 60 and 90-lb. Bursting strengths are determined exclusive of adhesive film.

Forming the bond

The apparent simplicity of the sticking process should not lead to the assumption that gummed tape adheres to a shipping container simply because it is sticky and tacky, like medical adhesive tape. Medical adhesive tape retains its "tackiness" indefinitely and can be used time and again if desired. However, a gummed tape user gets only *one* chance to make the strip stick—it must be properly conditioned and applied the *first* time.

The *permanent* grip of gummed sealing tape is obtained by the "bond" formed between the soluble glue of the tape and the thousands of tiny "pores" of the carton through which the glue penetrates. In other words, when moisture is applied to gummed sealing tape, the glue dissolves into a flowable solution. When this solution of glue and water is applied to the carton skin, it penetrates into the dry porous surface. After the water has evaporated, these thousands of container surface pores are filled with pure glue from the surface of the

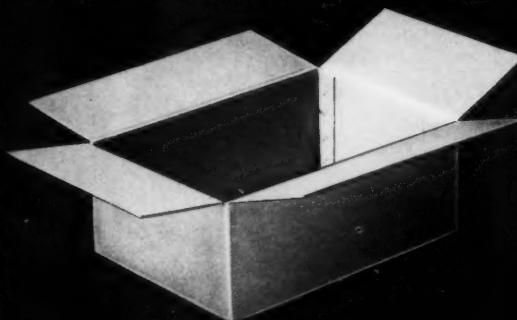
Gaylord Boxes

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tape. Tape, properly conditioned for maximum penetration, consequently forms an inseparable bond between tape and container. Any attempt to remove tape which has been thoroughly conditioned and correctly applied, could only be accomplished by also tearing the carton skin down to the line of glue penetration.

Gummed taped cartons withstand tests

Numerous and exhaustive tests of gummed tape-sealed cartons have been conducted by the U. S. Department of Agriculture, Forest Products Laboratories, at Madison, Wis. A huge hexagonally shaped testing drum is used in connection with these experiments. Six faces of the revolving drum are lined with "hazards" which are arranged in such a manner that the packed carton being

tested will tumble, flop and strike on ends, sides, top, bottom, corners and edges. In one series of tests, 2 1/2-in. 60-lb. kraft tape applied over the horizontal side and end scores of a 60-lb. glued container showed three times the resistance to rough handling.

Importance of the seal

A shipping container is no stronger than its seal. The particularly vulnerable points of any container are the center breaks and horizontal end scores. Unless they are properly and securely sealed, the contents might as well be shipped in a paper bag. When a shipper considers the shocks and jolts a container might be forced to endure while in transit, the inclination is to be more careful in sealing it. Unfortunately, too little time in the past has been spent investigating this important phase of the manufacturing process. Today, more than ever, because of the pressure being placed upon shipping departments, hasty, haphazard sealing occurs too frequently. This is dangerous to the shipment itself and dangerous to the shipper's future relations with his customers.

Shippers who pack exceptionally heavy merchandise in tape-sealed containers often appear to think that additional strips of gummed tape applied in various directions on the carton will reinforce it for maximum security of the contents. However, a tape-sealed carton can best be reinforced by applying the second strip *directly on top of the first*. In this way the bursting strength of the protective strip will actually be increased from 60-lb. to 120-lb. Furthermore, various tests have proved that 25 per cent additional sealing protection is obtained when the overlaps of end strips are applied horizontally on the container rather than vertically. Special instruction charts on how to seal are furnished by machine and tape manufacturers. They are worth writing for.

Kinds of gummed tape

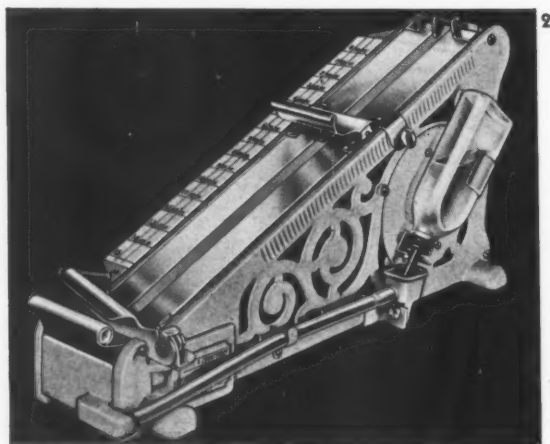
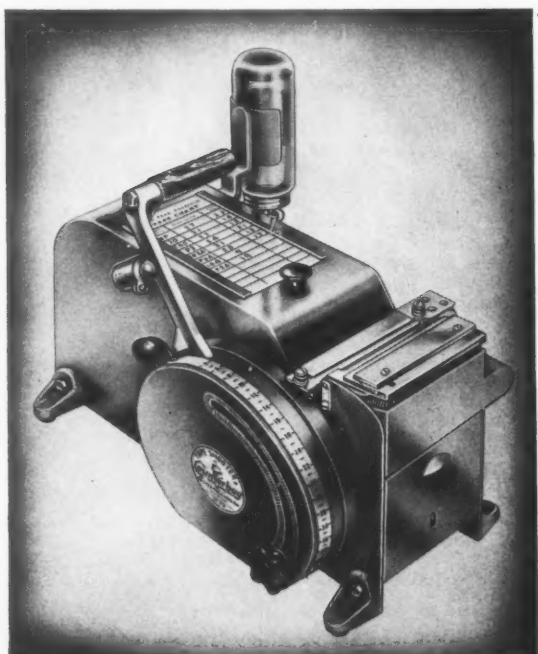
Although 60-lb. kraft tape is most generally used, it can hardly be considered the answer to every tape-sealing problem. In addition to 35-lb. and 90-lb. kraft previously mentioned, there is a brisk demand for cloth, bias-woven burlap, sisal and snake tapes. Space does not permit an elaborate discussion regarding the purposes to which these various kinds of tape are applied, but contact with any gummed tape mill will give a shipper specific information.

Many semi-automatic and all automatic machines are equipped with measuring scales by which the packer can accurately determine the correct length of tape to dispense for the carton being sealed. This feature is an important factor in conserving tape.

To obtain full advantage of this feature, shippers should instruct their box maker (who as a rule will be glad to cooperate) to imprint their shipping containers with the required lengths for the short and long sealing strips. This eliminates the need for guessing these measurements when dispensing tape to seal the carton.

This idea can help every shipper who uses corrugated containers. Most containers require 6 strips of tape for

1. Fully automatic tape sealing machine. 2. Semi-automatic machine. Photos Better Packages, Inc.





How Did That Get There?

Model RA put it there. In 1 1/2 seconds! And on 2999 other RCA Radiotron bases within the hour!

See how the clean, sharp, durable lines match the clarity of hand engraving. Lasting legibility from the RCA monogram to the end of the type-of-tube identification.

Years from now, because of the long, satisfying service it gave him, some consumer will want to replace this tube. He'll wipe the grease and dust away and this whole impression will re-appear as clean-cut and easy to read as it is today.

Markem markings assure repeat business from satisfied users. Does your future enjoy this protection?

Year after year, Markem machines apply these identifications to RCA Radiotrons—to millions of them. Surely, if more efficient, more dependable, more economical marking methods or machines were available, RCA's able engineers and production men would have adopted them long ago.

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BOXES, LABELS, TAGS, ENVELOPES. Easy-to-operate Markem Machines print them with trademark and specification imprints, quickly, easily and inexpensively. Print boxes packed or empty. Labels, loose or on the box. Materials may be paper, boxboard, cardboard, fibre, wax paper or plastic. These machines also do a perfect job on glassine envelopes.

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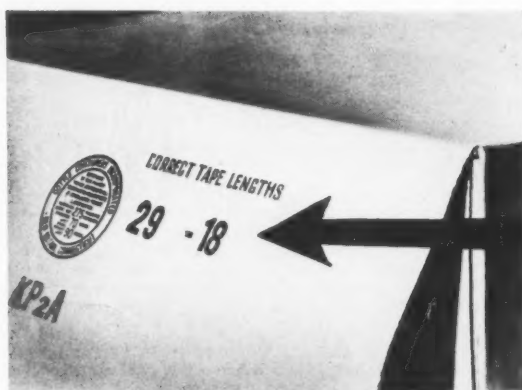
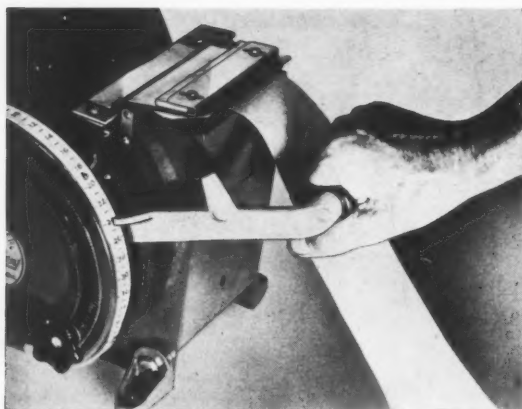
COLLARS, SOCKS, STOCKINGS, SHIRTS, SHOE LININGS and all that myriad of large, hard-to-handle pieces of textiles, leathers and synthetics are marked in necessary detail and trademarked—all with special process Markem inks which assure legibility and durability of impression. Color possibilities limited only by colors available under war regulations.

GLASS, METAL, WOOD, PLASTICS, PAINTED SURFACES, RUBBER SHEETS—even ABRASIVES! There are Markem machines to trademark, decorate, size-mark, part-mark and do all other stampings on these products in the most approved Markem manner.

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You Made 'em - Now MARKEM !



3. Tape dispensers insure no waste. 4. Correct tape lengths may be printed on boxes by box maker for economy and convenience. Photos Better Packages, Inc.

proper sealing. This means 12 tape ends. Hit-or-miss methods usually waste about 3 in. of tape on each tape end—a full yard of needless tape on each box that *will not give additional security to the contents*. Multiply this by the number of boxes shipped annually in any particular instance, and a realization of the dollars-and-cents saving can be brought home forcibly. On the average, visual measuring saves about 35 per cent of the tape used in a shipping room.

Setting machines for required lengths

Pre-set selective-measuring machines are offered by a few manufacturers to increase the sealing output for shippers who tape-seal "runs" of containers each having the same length and the same width. These machines can be set in advance for repeated feed of the long and short strips. However, once set for predetermined strips, intermediate lengths are possible only by re-setting this type of selective measuring machine. Recently, another type of repeated length sealer was introduced which permits pre-setting for *three* separate lengths in addition to dispensing intermediate lengths when needed without making an additional adjustment. In other words, a packer can be stopped at any of three desired lengths, but nevertheless can also obtain *any other* length strip without first making an adjustment on the machine itself.

Various moistening methods

A method developed in Austria a number of years ago moistened the tape with a felt wick or pad. However, in a relatively short time a crust was formed on the wick by the drying gum which had been scratched from the tape by previous dispensing. This completely prevented water from reaching subsequent strips.

Improvements over the Austrian models offered by American manufacturers are essentially the same, with a felt wick moistener, but they too failed to perform a satisfactory moistening job.

Roller type moisteners, next introduced, operate by pulling a section of tape over a cylinder which revolves in the water tank. This is more satisfactory than a felt moistener because it delivers more water and is simple to maintain. However, because it lacks proper tension and water control, tape moistened with one of these appliances often becomes soaked and slippery through the center though dry on both ends. In 1922 the first "hand-pull" tape sealer adapting the brush moistener was introduced. The principle of application for this type of machine is similar to the stroke of a painter's brush. Adequate water is distributed evenly over the complete gummed surface of the strip, thereby eliminating "dead" spots which cause blisters and "popping" tape. Better results can be obtained with pull moisteners if they are placed at eye-level to the packer. In this way there is no alternative but to pull the strip *down* over the brush or roller. Otherwise, particularly during rush hours, the packer might often be inclined to pull out the strip in *upward* fashion, and fail to obtain the required pressure and even distribution of water over the gummed surface.

Semi-automatic machine

With semi-automatic machines, tape is not pulled manually, but instead it is pushed across the moistener by hand action, either on the lever or, more commonly, on a sliding feed bar. In other words, regardless of a packer's inexperience or the "rush" conditions under which he is sealing cartons, correct and constant pressure is automatically maintained on the tape when it passes over the moistening unit by means of a gravity pressure plate; hand action applied to a shear near the moistening unit usually cuts the tape on this kind of machine. Some semi-automatic models will slit gummed tape into 2, 3 or 4 widths during the feed stroke, and a number are equipped with an auxiliary water fountain which reduces "time-outs" for tank refilling.

Automatic water supply control

All automatic machines and a few semi-automatic sealers are equipped with automatic water supply control. This feature makes it possible for a gummed tape user to pre-set the machine for the *exact* amount of moisture required accurately to condition his tape for maximum adhesion. A simple set screw adjustment beneath the auxiliary fountain permits more or less water to flow from it into the moistening tank where the proper level is constantly maintained.

SEYBOLD Morrison

WIRE STITCHING MACHINES

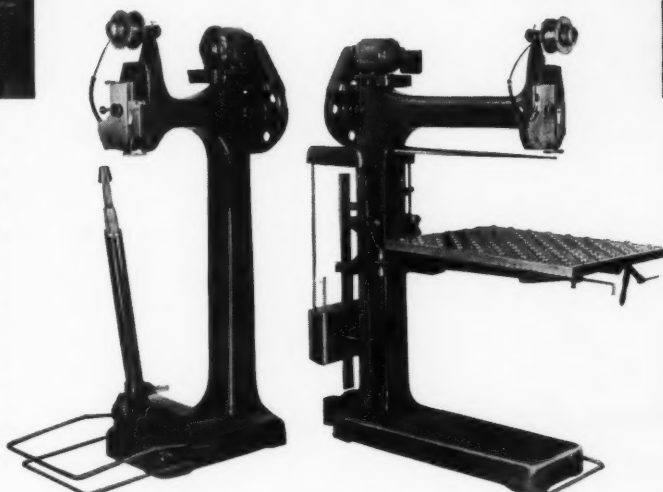


BOTTOM STITCHING

(Above) Bottom stitching corrugated containers on the SEYBOLD Morrison Wire Stitching Machine illustrated at right. Designed in two models: Model SLH with 15" throat and Model SLJ with 25" throat. Where required, an arm can be installed to make the machine a combination "Arm and Bottomer."

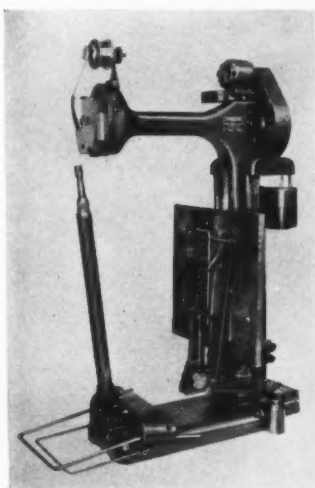
Assembling and sealing corrugated and solid fibre containers with SEYBOLD Morrison Wire Stitching Machines speed packaging operations and reduce packaging costs appreciably in comparison with other methods.

These heavy duty machines are equipped with the exclusive and patented Type-SL Stitcher Head. Complete information will be furnished promptly but actual shipments are subject to U. S. Government wartime regulations.



TOP SEALING

(Above) Top sealing corrugated containers on the SEYBOLD Morrison Wire Stitching Machine illustrated at left. Designed in two models: Model SLM with 25" throat and Model SLP with 33" throat. Equipped with blade anvil arm and quickly adjustable roller top table, as illustrated.



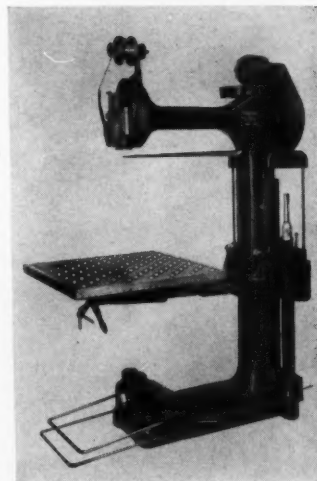
COMBINATION TOP AND BOTTOM SEALER

(At left) SEYBOLD Morrison Combination Top and Bottom Stitching Machine set up for bottom stitching with blade anvil folded down, counterbalanced roller top table up, and clincher post in position.

(At right) The same machine set up for top sealing. This type of unit is designed in two models: Model SLQ with 25" throat and Model SLR with 33" throat.

OTHER TYPES OF MORRISON STITCHERS

The complete line of SEYBOLD Morrison Wire Stitching Machines includes 15 standard models of bottom stitchers, top sealers, combination units, side seamers, and arm machines in a wide range of sizes and practical throat depths to meet practically all standard requirements.



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HARRIS-SEYBOLD-POTTER CO.
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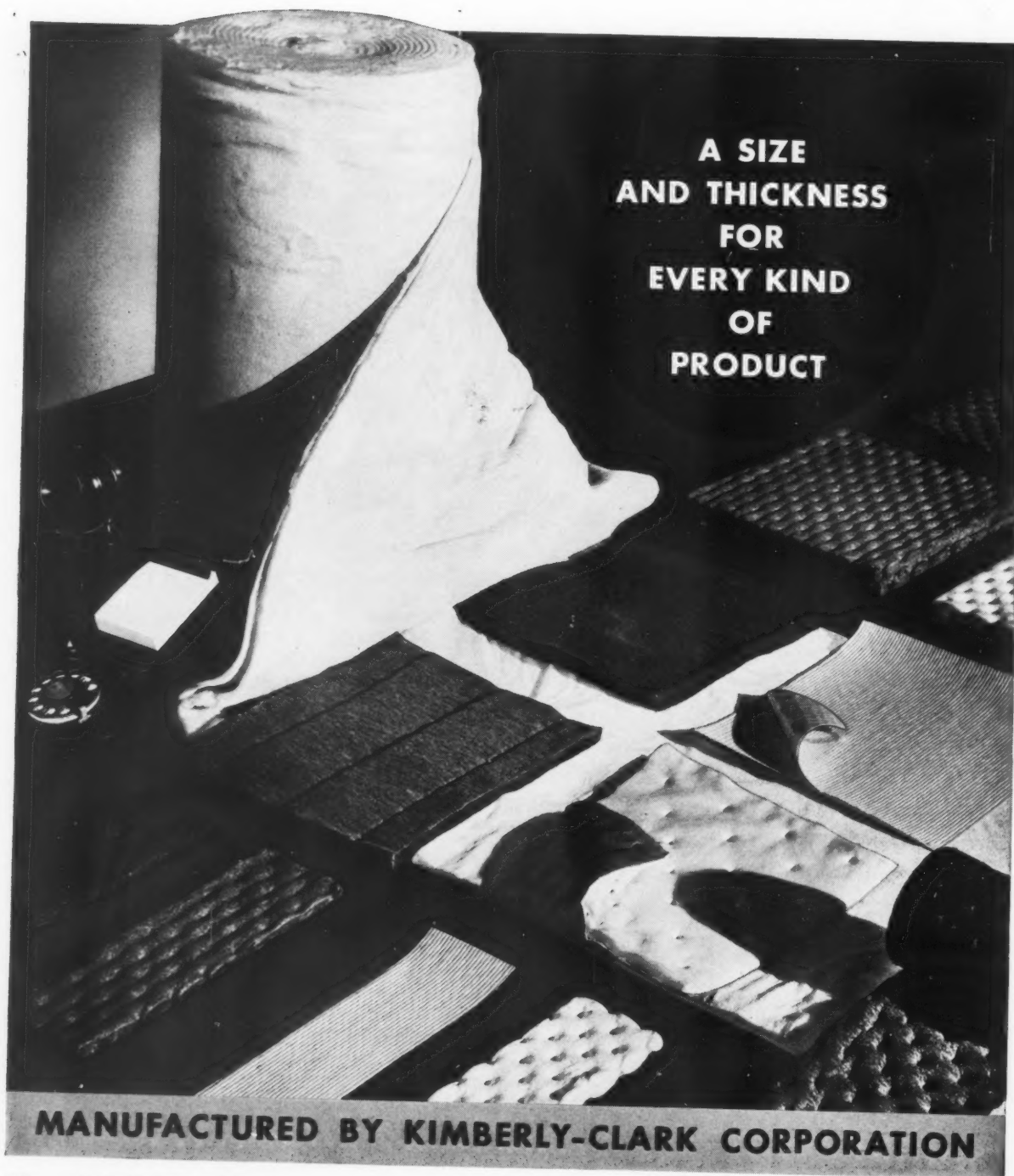
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Protects Against

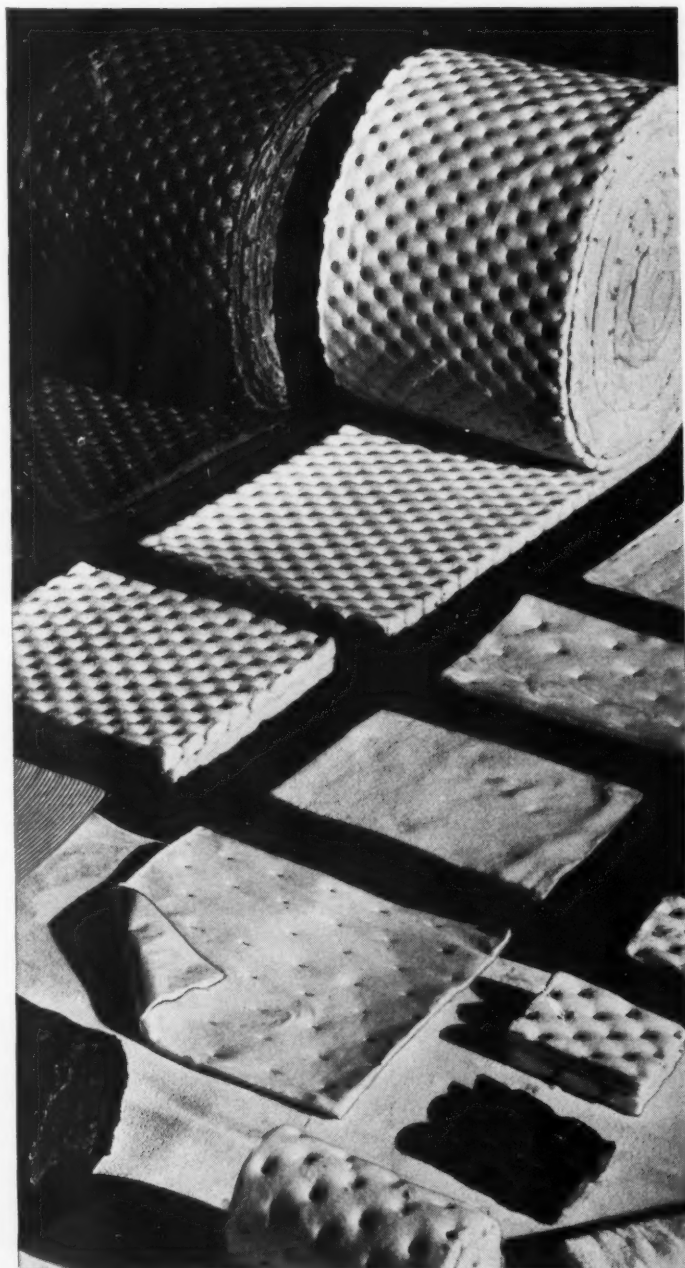


**A SIZE
AND THICKNESS
FOR
EVERY KIND
OF
PRODUCT**

MANUFACTURED BY KIMBERLY-CLARK CORPORATION

Wadding

All Shipping Damage —



PROTECTS WAR PRODUCTS

War products for our fighting forces demand the utmost in skilled workmanship and fine materials. But equally important as their production is the getting of these war products to their destinations, unbroken and unmarred, in fighting condition. Significantly, more and more war products are being KIMPAK*-protected when transported from points of assembling to final destinations.

KIMPAK FITS SPECIFIC NEEDS

KIMPAK is extremely light in weight. Adds but little poundage to shipping container. There is a size and thickness of KIMPAK to provide dependable packing protection for war products of metal, plastics, glass, and wood. Whether the product is large or small, angular as a machine gun, or smooth as a shell, there is a style of KIMPAK to protect it.



PROTECTS PEACETIME PRODUCTS

Space limitations make it impossible to show every type of KIMPAK which is available, but some of the most popular standard forms are pictured here.

When consumer items are protected with soft, resilient KIMPAK, they not only are guarded against damage in transit, but KIMPAK actually adds to the eye appeal of the package. KIMPAK'S rich texture and snowy-white color "set off" every kind of merchandise to better advantage—add eye appeal that stimulates sales. In addition, because KIMPAK will absorb 16 times its own weight in water, it is specified in many of the large plants of the country where protection from leakage of containers is required.

Learn more about this remarkable protective material. Find out how KIMPAK can save time and money in shipment of merchandise. KIMPAK is available for immediate delivery.

Write for complete information.

*KIMPAK (trade-mark) means Kimberly-Clark Wadding

CREPED WADDING DIVISION, NEENAH, WISCONSIN

No sealing machine can possibly condition gummed tape to its anticipated adhesion during *every* season of the year without automatic water supply control. Tape requires less moisture in hot, humid weather than it does during cold, wintry months. The explanation is obvious. In hot weather the glue becomes "pasty" and "sticky" and figuratively "sweats" from the kraft paper. Less moisture is required to thoroughly dissolve the sticky glue and attain better adhesion. In winter, the glue hardens and more moisture is needed to break down the hard, solid mass for proper conditioning. Consequently, *adjustable water supply control* is of immeasurable assistance in obtaining maximum gummed tape adhesion during *every* season of the year.

Automatic moistening machines

A new problem in the adhesion of gummed tape was introduced when users began demanding "setting time" of four to five seconds. At the same time, soft porous jute containers were being replaced by harder and far less porous kraft, which contained a certain amount of sizing in the pulp for water-proofing effects. This advancement not only added to the ability of containers to withstand

5. and 6. Pull type gummed tape sealing machine where lever or gripper propels the tape over moistening unit. It delivers predetermined length of tape cut accurately and moistened. Photos Nashua Package Sealing Co.



long trips, but allowed heavier and more valuable goods to be safely shipped in containers, if the seals were secure.

Automatic machines were developed to cope with this problem. These machines completely revolutionized the tape-sealing field when they were introduced, not only because they expelled tape faster than ever before, but because they distributed an increased amount of water at greater speed and evenly.

Some automatic gummed tape-sealing machines practically eliminate the packer entirely from the moistening picture, being only 10 per cent dependent upon his ability. By simply pulling a handle, tape is thoroughly conditioned for maximum adhesion. The strip is automatically cut upon the handle's release.

Using tape economically

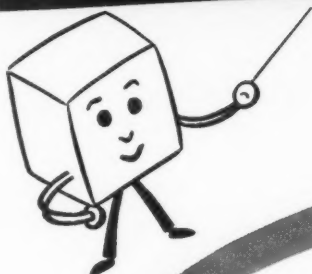
Simple pressure plate adjustments of completely automatic moistening machines can be pre-set for the *exact* requirements of the gummed tape being used. For example, the tape you are using probably requires more or less applied pressure as it passes over the moistening unit than that used by another shipper. If your packer is using a hand moistener you should make certain that the machine is placed in the proper position, i.e., at eye level and that he is cautioned about the pitfalls in the use of this equipment. In order to maintain accurate, uniform conditioning of your tape, it is necessary for the packer to understand the *exact* pressure required and to maintain this pressure consistently in pulling out each and every strip. The advantage of pull-moisteners is the exceptionally low price. However, unless caution is maintained, the actual cost in terms of insecurely sealed merchandise can far exceed the savings involved.

If your shipper is using a semi-automatic sealer, he can adjust the water supply so that the proper level is maintained in the tank, but mechanical pressure remains constant and hence fails to give the best results if lengths exceed 15 in. As previously mentioned, the most effective operation of semi-automatic machines is obtained when strips are short and dispensed slowly.

Completely automatic moistening machines, though higher priced, yield maximum efficiency because, not only can the water level be adjusted to the specific requirements of your tape, but the amount of mechanical pressure needed as the tape passes over the moistening unit can be controlled by simple adjustments on the plate itself. This is very important when lengths used exceed 15 in. and are rapidly dispensed.

Automatic moistening machines also provide the convenience of permitting tape to become "tacky" before it is applied. For a faster grip, it is always advisable that a packer dispense a second strip from the machine and permit it to dangle a few seconds while applying the first. Manufacturers' representatives of these automatic machines are usually trained to adjust the moistening and water supply control for the particular tape the shipper is using. Readjustments are always possible, but once set, they literally do their own thinking, and almost completely eliminate a shipper's dependence upon the personal whim and ability of the packer.

PACKAGING HAS NEW PROBLEMS



IT'S no longer difficult to sell goods. Today the problems are production and conservation.

Our peacetime experience stands us in good stead as we supply the armed forces and essential industries with the corrugated shipping containers they need to protect precious goods.

Our wartime experience will stand *you* in good stead when you want the displays to help you ship and sell goods economically—when there are goods to sell, after the war.

This display stand is an example of the kind of product we offered to all. Today, our facilities for making these stands are limited. Tomorrow — with victory — you will be able to get them once more.



THE OTTAWA RIVER PAPER CO.

» » TOLEDO, OHIO « «

Corrugated Shipping Cases, Sheets & Liners, Special Corrugate Fillers & Die Cut Parts

Packaging for Export

by J. D. Malcolmson

BECAUSE of the need to conserve space in PACKAGING CATALOG, this article will of course not attempt to make a thorough coverage of this subject, but instead will touch on some of the outstanding points and direct the reader to sources of more detailed information. These sources will be found in the bibliography at the end of this article. Particular attention is called to Chapter J of the Bonnell Manual which includes 40 pages of very valuable and concise information on this subject.

In considering packaging for domestic shipments, the problem is somewhat simplified by the existence of the uniform packing requirements itemized in the Consolidated Freight Classification which applies uniformly to all of the railroads, many of the coastwise steamship lines and many of the motor carriers. Unfortunately this condition does not exist for trans-oceanic shipments, as not even the efforts of the North Atlantic Conference have succeeded in developing uniform packing methods. It is, therefore, up to the shipper to foreign ports to consult with the individual steamship line he expects to use as regards acceptable containers or packaging methods.

Export shipments during normal times

It is a sad but well-known commentary on American industry that we have paid a great deal less attention to export packaging methods than most of our foreign competitors. This is undoubtedly due to the fact that the

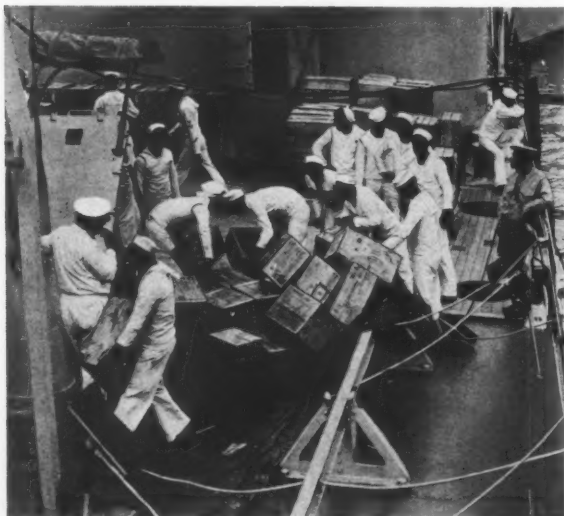
average American manufacturer had enough domestic business to keep him interested, and his export shipments, if any, were left more or less to chance. This generality, of course, is not applicable to the very large American Industries who depend to a considerable extent on export business.

Our chief trouble in the past has been a failure to foresee the much more severe treatment which export packages receive as compared with domestic shipment. This includes loading onto the ship, stowage in the hold, exposure to shifting cargo and damp atmospheres on the voyage, unloading of the ship—in many cases by unskilled labor perhaps with lighters, and, finally, transportation to destination by every conceivable means. Still another hazard is the amazing ingenuity shown by natives of many foreign countries in pilfering part of the contents without leaving any evidence on the outer container. The U. S. Department of Commerce has suggested that the following points be kept in mind in deciding upon the most serviceable export shipping container:

1. The nature and value of the article.
2. The unloading facilities at the port of destination.
3. The inland transportation system in the country of destination.
4. The climatic conditions en route and in the country of destination.
5. The amount and nature of trans-shipping that may be required en route to the final port of discharge.
6. The probable pilferage owing either to nature of goods or the country of destination.
7. The Consular rules and regulations and custom duties of the country of destination.
8. Other special conditions determined only through actual knowledge of conditions in the particular country of destination.

For instance, some countries may assess import tariffs on the gross weight or on the legal weight, or on the tare weight. Thus, if the tariff is assessed on the gross weight, it is naturally very important to make the lightest weight container that will carry safely. One of the largest manufacturers of electric refrigerators not long ago reported that one of the South American countries assessed tariffs on the gross weight and these were payable in gold. By changing the outer container from a heavy wooden crate to a sturdy fibreboard container with adequate interior protection, the reduction in gross weight effected a savings of \$10 per refrigerator in custom duties. It should also be borne in mind that ocean freight rates are calculated not only on the weight but

No one knows when supplies are packed which or how many of the seven seas they will have to transverse. Here stores are being loaded on a ship in Chinese waters.

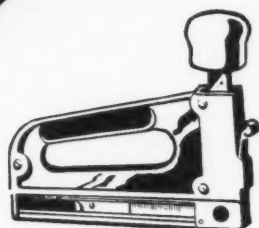


Official U. S. Navy Photo

HELLER STAPLERS

HUNDREDS OF MODELS FOR EVERY NEED
THE EXACT SIZE AND KIND OF STAPLE AND STAPLER
TO GET THE MOST EFFICIENT FASTENING RESULTS

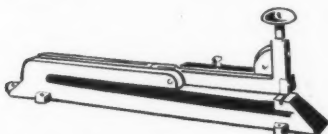
for
CARDING
PACKAGING
SHIPPING



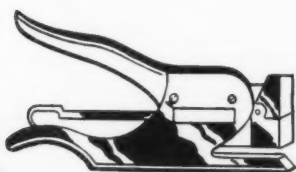
"RED HEAD" TACKER — For hundreds of tacking uses.



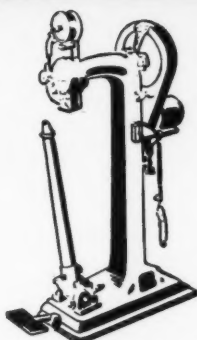
HAMMER TACKER — Operates like a hammer.



DEEP THROAT CARDING STAPLER
Staples your merchandise to card securely and neatly.



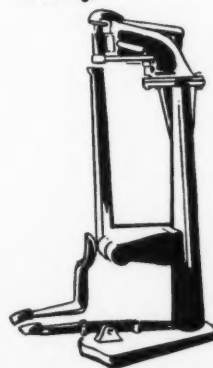
PLIER STAPLER — For many fastening operations.



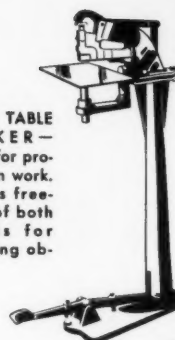
POWER STITCHER — Makes its own staples. Recommended where heavy and continuous production is necessary.



ONE HAND TACKER — Lightweight. Reaches confined places where hammer cannot be swung.



FOOT BOTTOM STITCHER
Stitches wide bulky cartons. Special extended foot pedal assures more speed and more effective operation.



FOOT TABLE TACKER — Ideal for production work. Allows freedom of both hands for holding object.



FOOT SIDE STITCHER FOR CARDING — Adaptable to every carding job.

Heller Staples and Staplers can handle almost any carding job —with speed. Our trained Engineering Staff can solve your fastening problems. Write for details, — send samples and let us do the rest.

★

To solve your shipping problems — get instant sealing without loss or damage by weakening from moisture or handling.

If it's Speedy — Efficient — Economical

"IT'S A HELLER"

THE HELLER CO. 4312 EUCLID AVE.
CLEVELAND, OHIO



Axle assemblies are boxed separately at the Chevrolet Export Boxing Division of General Motors Corp., and protected by paper lining for the wooden box.

also on the cubic space occupied so that it is very important to knock down merchandise to the greatest possible extent.

The proper marking of export packages does not sound complicated, but many shippers fall down on this point more through ignorance than carelessness. Your insurance company, or even the American Consular representative, can usually offer good advice, and on page 234 of Bonnell's Manual there is a table showing most of the common caution markings such as "This Side Up" translated into Spanish, French, German and Portuguese. Many foreign countries also require the gross, tare and net weights to be shown in metric figures. A valuable booklet in this connection is the "Units of Customary and Metric Measure" issued by the Department of Commerce as Publication No. M 121. These voluminous tables will save an enormous amount of figuring.

Export shipments during war times

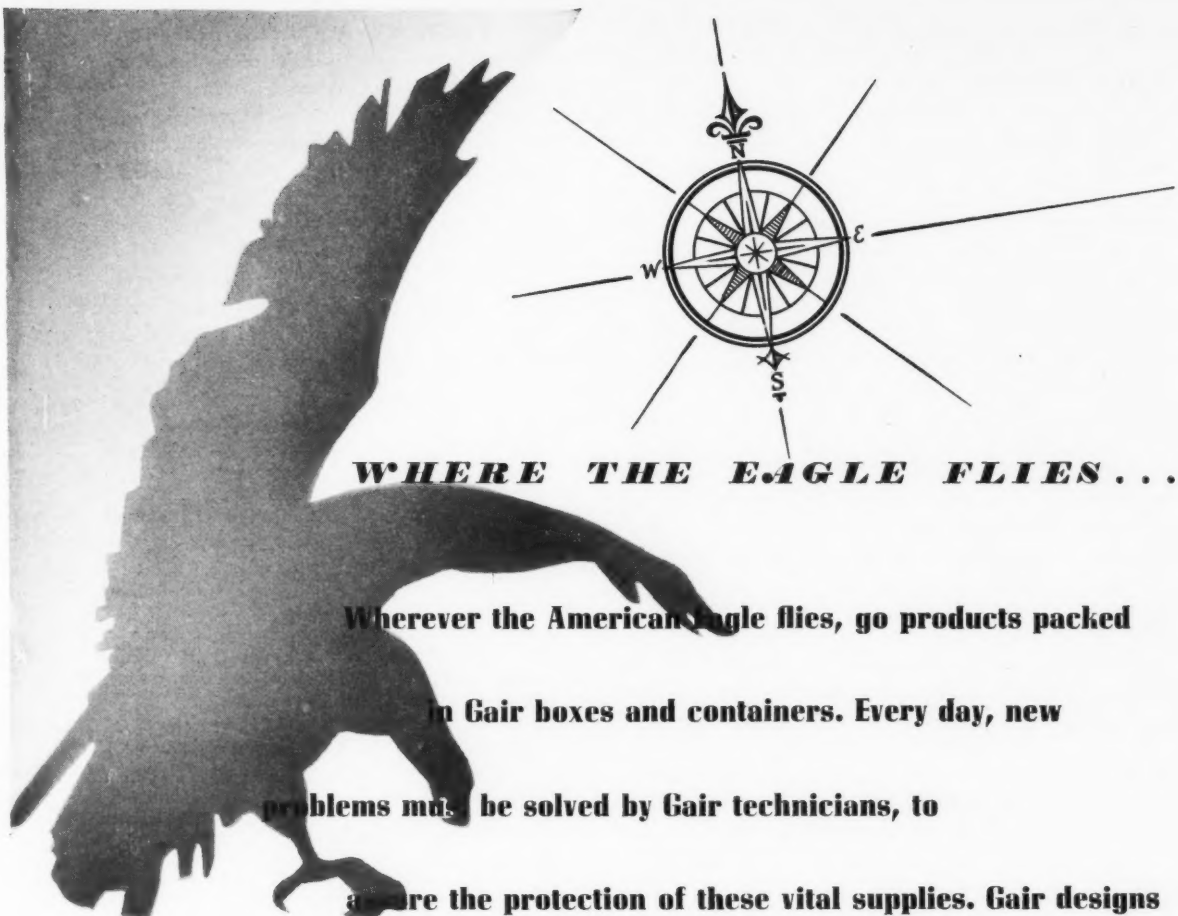
War times always accelerate technologic developments and shipping methods are no exception. During the last war the Forest Products Laboratory at Madison, Wis., made some almost unbelievable savings possible in cargo space and tare weights in the overseas shipment of artillery wheels and nearly every other commodity required by the Ordnance Department. Naturally much of this

development endured through application to peacetime shipments, and of course the past 20 years of peace have also shown great improvements in export packaging. It is quite evident, however, that we still have a long way to go before we reach the ultimate in such developments and this present war has already started to accelerate our knowledge of shipping methods. As a matter of fact, the problems this time are probably 100 times greater than in the past war due to the fact that in this war it is necessary to ship equipment all over the world under every possible form of transportation including cargo planes. The fact that we still have much to learn is well illustrated by some government developments just during the past few weeks.

For instance, certain Army clothing which was formerly packed in fibre and wooden cases is now being compression baled with a space saving of 35 per cent. Shovels which were formerly shipped in wooden crates are now being simply strapped together with wire saving 20 per cent in space. A field range stove for the Army which was formerly shipped in a double crate is now being shipped in a newly designed single crate saving seven per cent in space. Army garbage cans formerly shipped separately in individual crates are now nested together in a lighter crate adequate for six cans with a space saving of 60 per cent. Army shoes which were formerly packed in individual cartons are now being bulk packed with a saving of 25 per cent. Machine guns formerly shipped one to a box are now shipped two to a box with a space saving of 35 per cent. This list could be extended indefinitely but it simply illustrates the urgent need of conserving every possible cubic inch of cargo space in order to offset the delays due to shipping all over the world and to combat the submarine menace.

Already, during the present war, technicians are far ahead of what they did in the last war. Thus, the Forest Products Laboratory has made enormous increases to its staff of packaging engineers and in addition is now operating a five-day course in training shipping men, and it is expected that the course will continue to run indefinitely. It is limited to a total of 35 men in any one week. The Containers Branch of WPB is also adding to its specialists in packaging, and the War Department is now planning to station packaging experts at unloading points all over the world. These special military units will be known as port battalions.

The crying need during wartime is to deliver merchandise in undamaged condition but at the same time to conserve every possible pound of weight and cubic inch of cargo space. For example, millions of cases of canned goods have been shipped to England on lend-lease and to the American Army abroad in "weatherproof" solid fibre boxes. These special boxes will withstand weeks of total immersion in water without disintegration and at the same time furnish very large savings in weight and cargo space. Cargo space is further conserved by filling in all remaining spaces in the hold with cases of canned goods or similar small packages. Trucks are now seldom loaded onto a ship empty as the truck body itself is being used to carry merchandise. The same idea can be



WHERE THE EAGLE FLIES...

Wherever the American Eagle flies, go products packed
in Gair boxes and containers. Every day, new
problems must be solved by Gair technicians, to
assure the protection of these vital supplies. Gair designs
and Gair construction speed their safe arrival — over
land or sea — no matter what the climate,
the terrain, or the type of handling.

Robert Gair Co., Inc., New York • Toronto

*For seventy-eight years Gair has
specialized in packaging for
the products of American markets.*



FOLDING CARTONS • BOXBOARD • FIBRE & CORRUGATED SHIPPING CONTAINERS

extended almost indefinitely and it is the patriotic duty of every shipper to keep in mind at all times the avoidance of "shipping air."

Another point that has to be kept in mind by all exporters is the fact that modern machinery and military equipment is made to far closer tolerances than in the last war. Thus, an unbelievable number of items such as airplane engine parts are now being made to tolerances of .0001 in. This means that the slightest amount of rusting of such a part renders it worthless. One of our military observers recently reported that he had seen a tragic sight in Egypt, namely, a large delivery of American airplane engines and parts which had rusted to the point that they were worthless even though most of us would not have considered this amount of rust as serious. Shippers of such items have accordingly developed most ingenious methods of protection. In some cases an entire engine is encased in a transparent moisture proof cellulose bag which is further protected by the enclosure of a "tell-tale" which changes color if in contact with the slightest amount of moisture-vapor.

Air freight

There is no question but what this war will usher in the permanent use of aircraft for the shipment of cargo freight. This will require the ultimate in package engineering to develop containers that combine the lightest possible tare weight with the greatest possible protection. Obviously corrugated fibreboard is going to provide one of the most successful answers to this problem. Fortunately, air freight will not have to be protected as

much as ordinary freight because in most instances the plane can travel directly from the point of origin to the ultimate destination, whereas ordinary freight shipped all over the world under present conditions of transportation has to be protected enough to endure a great many handlings. Several of the larger air transport companies are already creating packaging departments to study this new science.

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The following list of references is not intended to be complete but should furnish a fairly good start on the subject:

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Modern packaging for export undertakes and achieves the spectacular task of crating an entire war plane which is uncrated and assembled near the field of action.



Photo U. S. Army Signal Corps.

DISPLAYS

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War's Effect on Display

by Frederick L. Wertz

WINDOW display has not escaped the disrupting effects of the war—it will doubtless be thrown still further out of joint before the struggle is over. Shortages of paper and cardboard are only the immediately visible physical factors—manpower and transportation shortages are as acute here as elsewhere.

Let us consider, for instance, the drug field. Ten years ago it was the user of large quantities of display material. Then came the Robinson-Patman and the Fair Trade Laws and display was seriously affected. Today's indications—as far as present paper restrictions will permit—are that the drug field is again looking with considerable interest toward display promotion. Far-sighted drug firms are looking ahead toward more liberal days and are planning display programs as an advertising medium rather than, as sometimes in the past, as a point-of-sale merchandising help.

An advertising medium

Note the Lederle display shown in the accompanying photograph. Strategic placement of these displays will do much to draw public attention to the merchandise bearing the Lederle name and trade mark. There will be—for a time at least—greater patronage of the neighborhood store due to the gasoline and rubber situation



1

1. One effect of the war is to make the display installation man use "shank's mare." 2. A trade-mark is kept alive by the timely use of displays even when merchandise is scarce.

2



which has seriously curtailed shopping in distant business areas. Use of these displays, therefore, in the better types of neighborhood stores, will be the best sort of direct appeal that can be made to the consumer. But drug firms with "something to sell" are not the only ones to use this sort of promotion. It is being employed by the durable goods people also—refrigerators, automobiles, radios, etc.—who are not now plotting sales campaigns, but are definitely interested in keeping their name and fame alive in the public mind.

Oil companies, sharply restricted in the quantities of merchandise they can sell, are likewise now using displays to call public attention to their dealers. Even if they have to advertise merchandise and services other than their own, it is important to keep the motorist mindful of the presence of the filling station so that the station operator may stay in business until the time when regular products can be promoted as usual.

One advantage of display promotion—according to some of its proponents—is that its presentation generally has no competition for the observer's interest: A news-

paper advertisement has war news, sports news and what-not competing, within a limited space, for the reader's attention; the radio program may often be far more attractive to some listeners than the "commercial," but the display window stands alone to be seen alone.

The war is offering another serious drawback to extensive use of display material in the problem of transportation. Cardboard displays add up to tremendous weight—a campaign for 25,000 windows, it has been estimated, with all necessary materials and decorations, would require some dozen full-size freight cars. If ten large national advertisers, using two million displays a year, were to go into full action it would require a thousand freight cars to transport the window displays for at least a week each, to move the material to the producer and out again into the field. With freight priorities what they are, the display industry must suffer.

Other problems to face

Unfortunately, however, freight is not the only transportation difficulty to be faced. Displays find their way to final destination by three methods: (1) professional installation, either through organized installation services or by crews employed by the advertisers themselves; (2) distribution by salesmen, with or without displays being installed; (3) distribution by parcel post or express, depending upon the dealer to make his own installation.

Tire shortages and manpower limitations have made serious inroads on the first two methods, leaving the third as the alternative. Some careful thought is being given to the matter of making displays smaller, not only to use less paper, but to cut the transportation weight. The few window trimmers who will be available may be able thereby to hand-carry the smaller size displays more

easily. Continued display installation services might thereby be possible. Of course this will entail extensive changes in the methods of producing, mounting and finishing display set-ups. Of interest in illustrating this is a widely distributed Pepsi-Cola display shown herewith. The center piece is 35 in. high by 50 in. wide, using two side columns. Forty of these, including crepe paper, cardboard caps for the columns, tacks and instruction sheets, were packed in containers with a total shipping weight of 100 lbs.—about two and a half pounds per complete display. If universally used, a 75 per cent reduction in freight requirements could be obtained and an installer could work with eight or ten displays under his arm—without using his car.

As a weapon of war

Many advocates of display promotion feel that the Allied cause could be furthered if more display material were employed for propaganda purposes, not only in the United States and Great Britain, but in neutral areas as well. British reports reaching England from Lisbon complained bitterly about the propaganda displays of Nazi Germany, and suggested that the same course be pursued in the interests of the Democracies. Some interest is being evidenced by the United States Government in window displays, and there is a tendency toward use of this medium; many commercial organizations have "institutionalized" their own promotional messages to some extent on behalf of Governmental propaganda, particularly in the sale of War Bonds and through variations of the "Sealed Lips" message.

Generally the interest in this type of promotion seems to be growing, and both during the war and thereafter we will probably see a healthy increase in its use both by the Government and by industry generally.

3. Forty of these Pepsi-Cola displays, including the crepe paper, cardboard caps for the columns, tacks and instruction sheets are packed in containers with a total shipping weight of 100 lbs.



Display Circulation Measurement

by Frederick L. Wertz

SOME years ago we developed a simple definition of circulation as applied to advertising—"The number of opportunities to deliver a sales impression."

In newspapers and magazines, circulation represents the number of copies of each publication containing an advertisement that is acquired by the public, regardless of how many individuals turn the page and see the particular advertisement.

In outdoor posters and car cards, circulation represents the number of people who actually have an opportunity to see the poster or car card, without regard to the actual number who may look at a particular advertisement.

In window display, circulation is the number of people passing a display on the near-side sidewalk, with the opportunity to see the display. As in other media, whether or not they look at it does not enter into the circulation count.

In measuring circulation, several qualifications have been formulated, such as returned newsstand copies, exchanges and sample circulation in the publication field, and in the poster field, distance and visibility.

Research applied

When The Advertising Research Foundation established the yardstick for the measurement of window display circulation, they made the qualifications extremely severe, and limited the circulation to the number of people passing on the near-side sidewalk only, not counting automobile, street car, bus or far-side sidewalk circulation at all.

Due to varying sidewalk traffic conditions in different parts of a city, the exact measurement of window display circulation presented many difficulties. The detail involved makes it impractical to apply circulation figures to each individual location. The Advertising Research Foundation decided that the question of coverage of a market could not be separated from the circulation. In their report entitled "Window Display Circulation and Market Coverage—How to Select, How to Verify" is a complete explanation of the method by which circulation and coverage should be determined.

Checking the method

This method was checked, tested and verified in nineteen laboratory cities. Formulas developed from these tests have been re-checked in a considerable number of cities by our organization, within the last two years, and these formulas have been found ultra-conservative in every instance.

The Foundation's research disclosed that there was a definite minimum display quota required for coverage, varying for cities of varying sizes, and that comparative circulation was obtained by the use of minimum, normal, first and second intensity coverage.

By dividing each city into business districts, a definite pattern for the distribution of displays was set up and, based upon this pattern, circulation figures for the varying intensities of display coverage were determined.

For example, in Waterbury, Conn., with a population of 99,900, the minimum showing of displays would be 13. Normal coverage would be 26, first intensity 39 and second intensity 52. Actual counts showed that the minimum quota of displays developed a daily near-side sidewalk circulation equivalent to 25 per cent of the population of the city. Normal coverage, 26 displays, developed a daily circulation equal to 50 per cent, while the circulation for first intensity coverage, 39 displays, was 75 per cent. Second intensity coverage, 52 displays, showed a daily circulation equivalent to 100 per cent of the population.

Number of displays required

On the basis of a display remaining in a window only one week (although it is well known that most displays will average ten days to two weeks in a location) we would have a circulation for 13 displays properly distributed in Waterbury, Conn., of 172,000. Normal cover-

1. Sidewalk "circulation" is attracted by wartime illustrations which dealers are glad to display.



age would give a circulation of 344,000, first intensity coverage 316,000 and second intensity coverage 688,000.

Of course quotas vary for each city, and the circulation per display would be higher in larger cities and less in smaller cities. However, applying these formulas to a complete coverage of the United States, as represented by all cities with populations of 10,000 or more, and assuming that displays were properly distributed, we arrive at the following figures:

Total Population	58,323,271
Minimum Coverage	8,952 displays
	103,943,200 weekly circulation
Normal Coverage	18,904 displays
	207,866,400 weekly circulation
First Intensity Coverage	26,856 displays
	311,829,600 weekly circulation
Second Intensity Coverage	35,808 displays
	415,772,800 weekly circulation

While the resident population of the cities of over 10,000 is 58,323,271, the estimated trading population of these cities is somewhat more than 90,000,000. Therefore a window display campaign which included all of these cities would cover fully 75 per cent of the entire population of the United States.

The weekly circulation figures shown above are based on near-side sidewalk circulation only. Vehicular traffic, far-side sidewalk circulation and the fact that displays may remain up an average of ten days or two weeks are additional values.

These circulation figures are based on actual eighteen-hour daily counts in laboratory cities made by the National Window Display Research.

It will be seen, therefore, that there is a definite yardstick for the measurement of window display circulation, and this yardstick has the approval and authority of The Advertising Research Foundation of the Association of National Advertisers, Inc., and the American Association of Advertising Agencies.

Every check that I have known to have been made since this yardstick was established has proved this measurement to be ultra-conservative.

It cannot be stated too often that window display is a reminder at the point-of-sale, where the opportunity is present for immediate action, so that properly planned displays compel the "circulation" to remember the product's advertising message. Window display is the best antidote to the "forgettin' man," whose lack of memory is probably the greatest single cause of loss in the effectiveness of advertising.

Specific Jobs Displays Can Do

by Edward T. Sajous

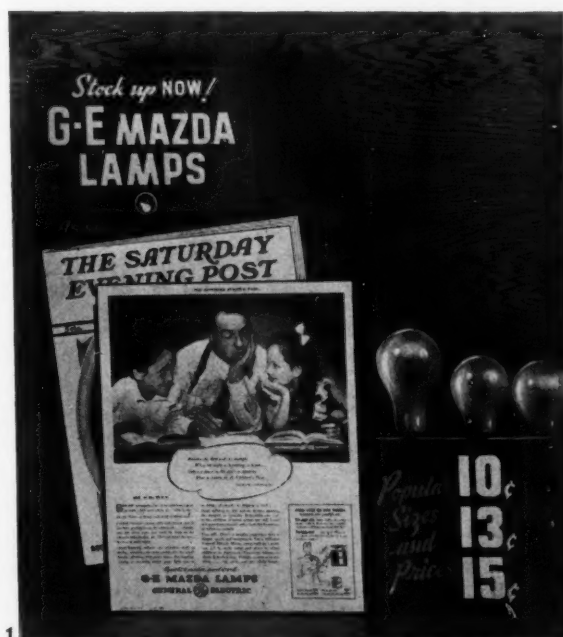
DISPLAY can do many jobs, but asking one piece or one series of pieces to do too many jobs all at the same time simply results in failure to make any one point or get across any one well-clinched message.

The piece frequently emphasizes equally a number of major elements including, perhaps, sale of a premium, suggestion of related items, emphasis on a prestige note and putting over a strong bargain price message. As a result, no single job is clearly and decisively accomplished and the material simply helps add to the unfavorable testimony against display to the disadvantage of all concerned—advertiser, retailer and display manufacturer.

In other words, the problem should be handled with an attitude of "from the inside out" rather than from an "outside in" approach. That is to say, creation should be based upon visualization of a definite objective, using thorough analysis and recognition of all the factors in the problem. Then precise planning and careful arrangement for use of elements specifically designed will attain the definite objective or hit the particular target set up.

What, then, is effective procedure in successful display, creation by the "inside-out" method?

As one point-of-purchase advertising authority put it



1. G-E Mazda lamps tie in this counter display with national advertising.



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2. Character trade-marks have always been one of the most valuable means of keeping alive brand names. 3. Related items are built into window arrangement with centerpiece highlighting Fletcher's Castoria in the proper care of children. 4. Institutional type of display using pharmacist's book and medical symbols. 5. Virginia Dare trade-mark character makes a three-dimensional unit.

some years ago, "A valid sales idea is the starting point for display planning." The following list of nine specific objectives, with selling points of display emphasis classified under each for reference, is offered as a guide in production of accurately aimed point-of-purchase advertising, precisely planned to fulfill exactly gauged needs:

{1} To gain attention:

- Use of dimensional effects.
- Emphasis on sheer beauty and quality atmosphere, frequently with color.
- Use of highly unusual, bizarre, spectacular effects—color, motion, lighting.
- Life-size figures, human interest.
- Bold poster treatment.
- Exaggerated size packages or products.
- Huge, mass effects by use of reproductions or actual packages or products.
- Smart, humorous, "gag-line" type copy in conversation balloons.
- Cartoons.
- Reproducing packages or products in human figure forms.
- Use of well-known, popular trade character.
- Animal figures—cartoon-type, if appropriate.
- Emphasis on trade mark, slogan, testimonial line or letter.

{2} To use atmosphere as principal feature:

- Institutional story presentation.
- History of company, product.
- Celebration of an anniversary.
- Presentation of story with scientific emphasis and color.
- Building scientific background for product.
- Use of humor.
- Building quality atmosphere, appeal.
- Developing holiday, seasonal appeal, background.
- Style atmosphere.
- Building gift theme.
- Appetite appeal.
- Sports background.
- Economy, price, bargain appeal.
- Specific group appeals—housewives, munitions workers, debutantes, secretaries, etc.
- Illustrating product in home atmosphere.
- Human interest.

{3} To coordinate with advertising and merchandising:

- Tie-in with main advertising theme.
- Coordination with magazine, newspaper, radio advertising.
- Continuity of package color scheme in display.
- Consumer contest tie-ins.
- Premium offers.
- Use of newspaper comic-strip advertising characters in display.
- Use of screen, stage, radio, sports stars.
- Tie-in with news events—local slants on national new happenings.
- Coordination with special sales program—deals, etc.

{4} To help the consumer:

- Easier shopping with product dispensers—floor, wall, counter, table, etc.
- Methods helping in correct selections.
- Dispensing advertising material—educational.
- Dispensing coupons, offers, contest announcements.

Dispensing samples.
 Convenience in handling merchandise by permitting customer contact with products, materials.
 Self-demonstration—offering customer something to do in action related to product.
 Offering customer something to do with action unrelated to product.
 Recipes, reminders, directions.

{5} To feature use of the product:

Emphasize cost of product manufacture, operation, etc.
 Bring out uses.
 Illustrate how to use, possible varieties.
 Suggest uses with other items.
 Feature new uses.
 "Before and after," dramatizations—benefits gained through use.

{6} To help the dealer:

Cooperative sales activities—groups of manufacturers joining in sales plan.
 Creating the departments to merchandise related items.
 Promotion of the related item idea.
 Helping improve appearance of retail outlets.
 Supplying suitable, atmospheric backgrounds for seasons, occasions and products.
 Improving dealers' services to customers.
 Featuring prices of merchandise or services.

{7} To feature the product itself:

Presenting new container frequently with old.
 Display full line of products, actual or in reproduction.
 Illustrate the product or package.
 Feature actual product or package in display.

{8} To feature manufacturing aspects:

Depict how product is made, processes, etc.
 What product is made of, raw materials, etc.
 Where product is made, factory, plant, shop, etc.

{9} To feature special sales points:

Increasing sales unit.
 Selling the product with related items.
 Emphasis on full-line selling.
 Selling necessary accessories with the product itself.
 Suggest sale by illustrating actual sale in process.
 Demonstration of the product, supplementing work of demonstrators with display.
 Featuring sales arguments in lists, summaries, etc.
 Highlighting one sales point, dramatization, etc.

This list, applied to a specific yardstick-product will produce many practical ideas. It may be found to be valuable in planning display material for all types, whether a single unit is proposed or a series.

Preparation and Planning of Displays

by Michael Gross

THE reason lithographed displays are looked upon as the "Orphan Annie" among the various mediums of publicity is just because advertising man persists in passing the buck to the display salesman; who passes it on to his art department manager; who, in turn, passes it along to the first artist on his staff who has a leisure moment. That sequence always has made, and always will, for mediocrity—the greatest scourge from which window and store displays suffer. It just cannot be done that way—successfully. A certain amount of ground-work must first be cleared away and certain foundation stones properly laid. Disheartening though it may sound, it is up to you, Mr. Advertising Man, to see to it that this essential portion of the task is accomplished efficiently and effectively. And of all the ways to go about the job, wielding the pick and shovel yourself tops the list.

See a dozen or more of your representative dealers; merchants who have shown that they are alert for any plan to increase business. Talk to them frankly. Tell them you want to get up window and store material which will meet with their approval; which will reflect their viewpoint as to what a display to feature your product should be like.

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But bear one thing in mind. Merely outlining your plan and then asking these men what they think of it will invariably result in a verbal barrage of: "Great stuff!" and "Sounds fine to me!" which leads exactly nowhere. It may flatter your vanity to ask what lawyers call leading questions and thus be sure of receiving only affirmative answers—but these leading questions too often result in altogether misleading information. The dealer is only human and would always rather agree with you than cross you. Not only is it much easier but it certainly involves far less mental effort to approve a plan than to think up objections to it. A good way to get definite information without tipping off what you, yourself, have in mind, is to ask the dealer to show you the displays your competitors are distributing and then urge him to tell you what he finds wrong with them. You may discover, early in your investigations, that a product such as yours does not turn over fast enough, nor does it yield a healthy enough mark-up, to warrant the dealer giving anything but counter space to a display featuring it; or that the material he receives from your competitors is altogether too large for the importance of the item; or, worst fault of all, that these displays feature the wrong selling point. Perhaps you'll find, to your utter astonishment, that what the housewife demands in your type of product is utility, whereas most of

the displays the dealer has been getting featured a beauty appeal. Or probably just the reverse may be true.

You'll come back from even a two-day trip of this kind with more factually founded information about what the dealer wants in the way of display material than you could have gotten from a month of burning the midnight oil trying to figure it out for yourself. You'll have a new, and an accurate, conception of what size your new display should be; how it should be constructed; and what selling points it should feature to make the storekeeper like it well enough to put it in his window or on his counter. And he's either got to like it that much or he may just as well not like it at all. You can't win half a battle with a dealer.

Window and store displays must be aimed to the dealer—not through him. If he doesn't think the material you send him will help sell more goods, he'll junk it—nor will all your excited talk about the low order of dealer intelligence serve to cancel half a line of that inexorable fact. After all, it is the dealer's window and you are merely a guest, coming in only if you are given an invitation. One sure way of being invited is to stop thinking about your problems and your sales and begin to pay a little attention to the dealer's problems and his sales. Always keep uppermost in your mind the fact that you need the dealer far more than he needs you, despite all you may have heard about building up such

an overwhelming call for your product that you will force the dealer to carry it, whether he wants to or not. (Of course, this generalization falls down during a wartime sellers' market.—Ed.)

The more time you spend finding out, from your dealers themselves, what they really want, and the less time you spend guessing what they want (or getting some display salesman to do the guessing for you), the more successful will your finished displays be and the more of your product will they sell.

But, important as it is to get this dealer viewpoint, the groundwork has not been fully laid when you have heard all he has to say. It is now necessary to do a little digging among your own salesmen. Either in person at a sales conference, or by individual letters while they are on the road, every man on your sales force should be told that a window display is being planned and that any helpful suggestion he can give you will not only be appreciated but immediately acted upon.

While it may be true that the average "knight of the grip" understands very little about the mechanism of consumer-response or the psychology of perception, you must admit that he does get around. He talks with dealers every day, intimately and frankly. He can tell you if the storekeepers in his territory will give window space to a display featuring the line or whether they will use only counter cards. He has discovered, by asking the direct question, exactly where he will be allowed to put up a window streamer; arrange a floor pyramid; or tack a show card on a bare expanse of wall. And he won't be guessing when he tells you about it. He actually does know.

An advertising man will invariably come closer to producing a 100 per cent perfect piece of store advertising by listening to the advice of his dealers and salesmen than he will from the layouts he makes sitting in his office, or that the lithographer's representative brings around to him. Merely summarizing such information as he receives will, at least, give him a cue as to whether he wants a window cut-out or just a counter card; what the approximate size should be; whether the actual package should be featured or left off; and if the selling price is to be played up, subordinated, or eliminated altogether. The wrong guess on just a single one of these factors has doomed to failure many an edition of otherwise perfect displays. Don't make the mistake of thinking that the more designs you allow lithographers to submit, the greater will be the selection and the more apt will you be to find a perfect display idea.

Aside from the economic loss to the various lithographers (I have seen \$1,200 worth of sketches submitted on an order that couldn't possibly amount to over \$750) there was invariably an aftermath of squabbles and petty bickerings. As the same story had been told to each lithographer's salesman, and as not one of these men had anything in the way of an original thought to add to that story, it was only natural that the submitted sketches would bear some resemblance to each other. And, because these designs did look alike, a flood of charges



1. This series of medium sized cards makes an appetizing presentation of a line of meat products in a form welcomed by dealers. Photo U. S. Printing & Lithograph Co.



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2. With practically nothing to sell to the civilian population, Goodyear utilizes display to keep its name prominently before the public and help the war cause, by means of these familiar store displays.

would immediately break forth when the winning display was placed on view. "That fellow lifted my idea bodily," one of the losers would cry; "You stole the construction from the sketch I submitted," would wail another; "That way of holding the package was originated by us," would yell a third—and the advertising man would begin to toy with the idea of taking a header off the nearest pier.

In point of fact, this condition became so bad that it forced buyers of display materials to turn to their advertising agencies, have them prepare display sketches, and then ask a few of the leading lithographers to figure on reproducing them. But this didn't work out so well, and doesn't to this very day, for a very good reason. Advertising agency training is in one direction only: the preparing of material to appear in newspapers and magazines. All of this copy is planned for what is known as a "short throw"—meaning that it must be definitely designed to be read about six inches from the eye. But a window display, to be successful, must be conceived for a "long throw"—it has to get over its selling message six feet from the eye—and the technique of preparing such material differs radically from periodical advertising. Another difficulty an agency man is up against is that all his experience is in mediums possessing only two dimensions: length and breadth, whereas a show window has a third one, depth.

Well, here is how the modern advertising man finds a solution. First, he makes his own selection from among the lithographers who call on him. Secondly, he makes a habit of scanning the imprints on the really outstanding displays he sees about town. And, thirdly, he consults the display sections of the advertising magazines. Having discovered who the display specialists are, he

gets in touch with not more than four of them, puts his problem before their representatives and asks for a few visuals from each. All he wants, please note, are rough sketch ideas—and that is all that is necessary.

There is no finer spur to a creative artist than letting him know he is pitting his ability against that of some rival display expert. There is also no better whetstone for an estimator's pencil than the knowledge that a couple of other lithographers are figuring on the same set of specifications.

And now you are finally ready to talk to the representatives of the lithographers who are going to work with you. Give them such basic information as to whether you want a window display, counter card, hanger or floor display; what type of store handles your product; whether or not you sell through jobbers; and what your plans are for distribution. There remain such secondary important questions as: "Are you going to ship the display with the merchandise?" If so, the salesman will want to know the size of your shipping container, so that he doesn't bring around a sketch which will have to be folded sixteen times to fit into it. Is the display to be shipped by itself? Then the size must be kept within parcel post limits, or you'll find yourself faced with a tremendous express bill.

Telling the salesman the few essential things he must know if he is to do a sensible job doesn't constitute, by any stretch of the imagination, furnishing him with an idea. You are merely fencing him in, so to speak, to keep him from wandering all over the lot. If you have consulted your dealers and salesmen, you are in the happy position of not having to ask the display salesman to guess. You tell him, instead.

Another thing the salesman will want to know is what quantity you were thinking of buying. To this question there is also a stock answer that is altogether meaningless. That comeback is: "You haven't landed the business yet and already you're worrying about how many displays I'm going to buy."

The size of the order is furthest from the mind of the salesman when he asks that question. Although it rarely occurs to the man on the buying side of the desk, quantity does make a difference in the type of sketch to be submitted. If you want only a thousand cut-outs, the salesman knows he must caution the art manager to stay away from elaborate constructions, complicated die-cutting and designs that will take many colors to reproduce. The quantity is far too small to absorb the heavy initial cost of elaborate engravings and dies. On the other hand, if you have in mind to buy 10,000 three-piece, 28 in. by 44 in. screens, the art department can let itself go the limit, for now the run is large enough to absorb the cost of preparing the job for the press and finishing it after the sheets are lithographed. If you'll just remember the fact that an elaborate die costs just as much whether you use it to cut out one thousand displays or one hundred thousand, you'll get the idea.

Now comes the salesman's parting thrust—and it has started more arguments than anything else in his repertoire of interrogations. The fireworks usually start—although there is no real reason why they should—when he gently asks: "And what do you expect to spend per display?"

There is one reason, and one reason only, that prompts the salesman to ask that question. He wants to know what artist to use and what type of display to submit that will come within the price limit you set. A certain artist, who specializes in just the very subject you want to feature on your display, may charge as much for one of his roughs as you have in mind to pay for the whole edition of finished cut-outs. How is the salesman to know that the assignment cannot be given to this particular artist unless you tell him what you have in mind to spend?

The best way to dispose of the price situation, fairly and tactfully, is in some such manner: Say to the man:

"In getting up your sketch, bear in mind that we can't possibly pay over a dollar each for ten thousand displays inserted in corrugated containers and sealed ready to ship. Of course, the more you can cut under this price and, at the same time, give us a real merchandising idea, the better will be your chance of getting the order away from your competitors. But, under no circumstances, will we go over a dollar a set."

Now let's see how far we've come. You've told the salesman the type of display for which you are in the market, based on your own knowledge of the definite dealer requirements; you've told him the quantity you want and what you have in mind to spend per display; you've told him how the material is to be shipped; how soon you want the rough suggestions; and when the job will have to be delivered if he gets the order.

With this information, plus a few other questions he may ask, any display man worthy of the name will be glad to go the limit to give you sales-producing ideas.

Relating Window Displays to Other Media

by Carl Percy

THE purpose of this article is to discuss window display in relation to other advertising. It is an interesting phase for the reason that it has many controversial aspects. It is well to remind ourselves that we are considering only the type of display material supplied by national advertisers for use in retail outlets.

Parenthetically, let it be said that this article is written without consideration of conditions imposed by a state of war. We have a war to win, we shall win it, and be on our way back to normal conditions. War conditions are by nature transitory; when those now famous blue-birds are flying over the white cliffs of Dover, we shall then wish to understand the problems of normal times.

Inasmuch as few advertisers follow exactly the same pattern in outlining their advertising policies, we must be aware of the fact that it is necessary to deal with typical cases.

There are advertisers who regard displays as a link in the selling chain and they quite naturally stress the importance of coordinating this link with the other such as radio, magazine and newspaper advertising. In theory, this is a perfectly logical position to take. However, as it works out in practice, our discussion may prove that there are times when this position is awkward in fact.

When an advertiser buys windows as a sop to dealers, or as a specific for salesmen's complaints, there is less likelihood of a serious attempt at coordination. This attitude toward display usually finds expression under the more dignified characterization of "building dealer good will."

There is a very definite line of distinction between such "good will" types of displays and those which properly come under the general head of altruistic displays.



1. This centerpiece of an Ipana display provided a tie-up of the product with cosmetics in general. Other altruistic side pieces backed up the key-noting central display piece. Slogan, "Smile of Beauty", is only link with magazine advertising.

These displays sometimes take on the institutional character and build reputation for both dealer and advertiser. The direct sales type of altruistic display is a two-edged sword, doing its work of carving out results in two ways at the same time. On the one side it generally ties up with the national theme and thus may be considered as coordinated and, on the other hand, it helps the dealer to secure more profits than the straight one-product display permits.

The author has in mind two cases which point out the extremes in evaluation of displays. One, where the advertiser looks upon window display as his primary medium and supplements it with newspaper, radio and billboard advertising. This company does not have a complete national coverage, and the advertising must follow the channels of distribution. The other advertiser spends a great deal in magazines of general circulation, as an extensive radio program, and uses other media such as billboards, newspapers, etc., very sporadically. (Mail Pouch displays are used as a primary medium.)

With window display, as with all advertising, the purpose is to sell merchandise to new customers and to keep old customers sold. It differs from other forms of advertising in that it must be shorter, bolder in treatment and easier to comprehend than, for instance, magazine adver-

tising. It is not easy to lift illustrations and text from magazine advertising and make therefrom good window displays, so the coordination must confine itself to one or two of the main selling points stressed in all other forms of advertising.

As a rule, actual merchandise is shown with the window display and in this respect window advertising differs from all other forms. From observation covering many years in this field of advertising, the author would say that by and large the best displays give little outward evidence of definite coordination—that is to say, there is no pictorial similarity to the current magazine advertising and there is no attempt to follow the exact text of the advertisements. The notable exception to this is to be found in Chesterfield cigarette displays which often are based upon the same illustration employed in space advertising.

That we may see that definite pictorial and copy coordination is not always indicated, let us go far afield and review some concrete cases. With a typewriter display, the object here is to follow through with a prospect on the basis of an invitation to come into the store and actually try the product. Such a sales device would be out of order in a product like shaving cream for which demonstrations, naturally, could not be offered.

In many cases the display is not the combat unit, but rather functions as a mopping-up patrol. This clincher-action type of appeal is well illustrated in the display for G-E Mazda Lamps.

Window displays often have been referred to as reminder advertising. The theory, presumably, is that national advertising does the selling job and the display is for the purpose of refreshing the prospect's mind. In this case it often happens that the only coordinating function which the display has to accomplish is to take some salient point from the national advertising and do a job of reiteration.

The pictorial device used to command attention is important, but to demand a dominant relationship between this and the pictorial content of the space advertising is unwise for two reasons. One, frequently the magazine illustration is not powerful enough for display purposes and it credits the consumer with vastly greater retentive powers than he possesses and, two, that in such an attempt the coordination is apt to produce a display which is not as powerful as it should be. Displays that are not attractive when considered apart from all other advertising are not apt to be acceptable to the retailers, and advertisers who insist on this relation will often defeat their own purposes.

Retailers who use displays supplied to them are not rank amateurs in appraising the "come on" value of a

display. Theirs is the power of life or death over the offerings made to them and they certainly will judge a display on its own merits and give little thought to coordination with other advertising. So it is that what seems so logical in theory does not work exactly that way in practice.

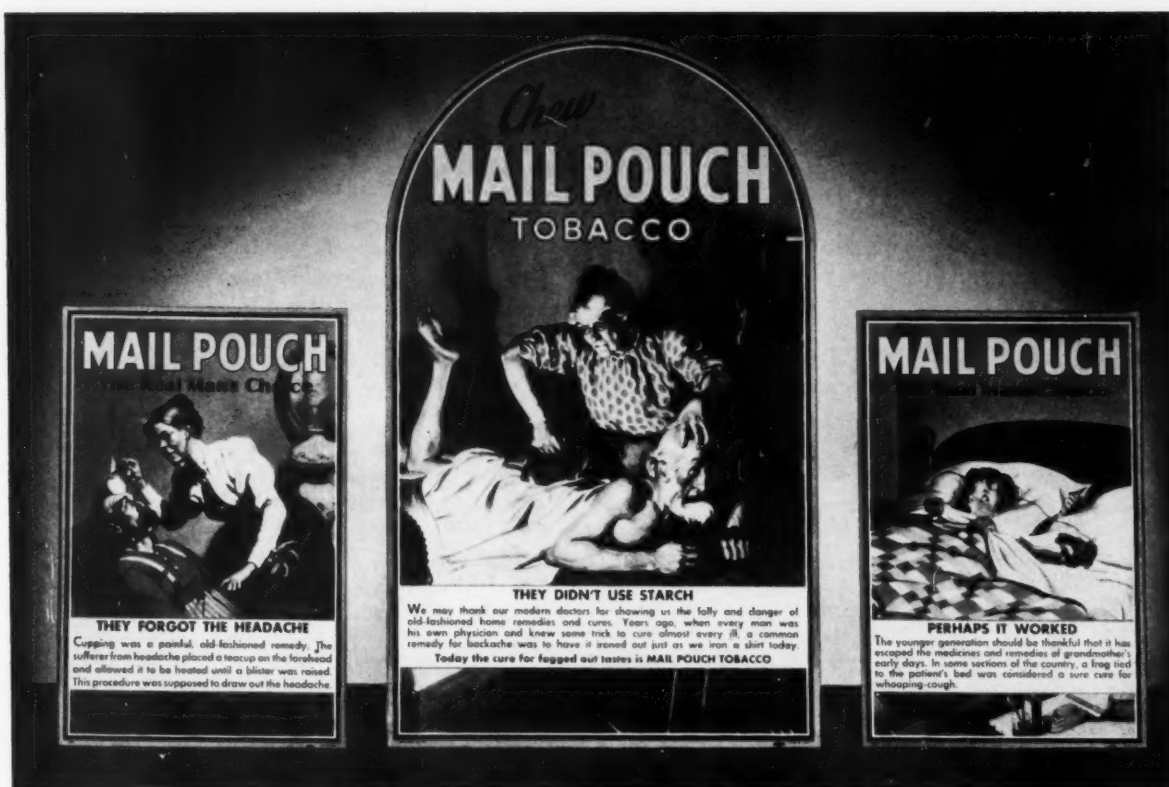
If we return again to the point that window display may properly be called reminder advertising, then the longer that reminder stays where it can be viewed by the public, the greater return to the advertiser. In the case of the Mail Pouch Tobacco Co., there were two very definite obstacles from a creative standpoint. First, it is a product that under normal conditions the dealer would not naturally select for prominent display. Second, the character of the product precluded the possibility of any lengthy disputations revolving around the appetite angle. Displays have long been regarded by this company as a primary medium, and the only coordination considered desirable was to register product name in an agreeable manner at point of purchase.

There was created for this company a series of displays of historical and topical interest. Each trim was designed to make the dealer's window attractive to the public, to give them reader interest and only incidentally to sell the product by the reminder value of the product name itself. These displays were painted in a high color key and reproduced in from eight to ten colors, thus

2. This series has been in constant use for more than a decade, yet dealers continue to want them. Some stores have on the walls every centerpiece produced in that time. "Vehicle" posters are both informative and historically correct.

2





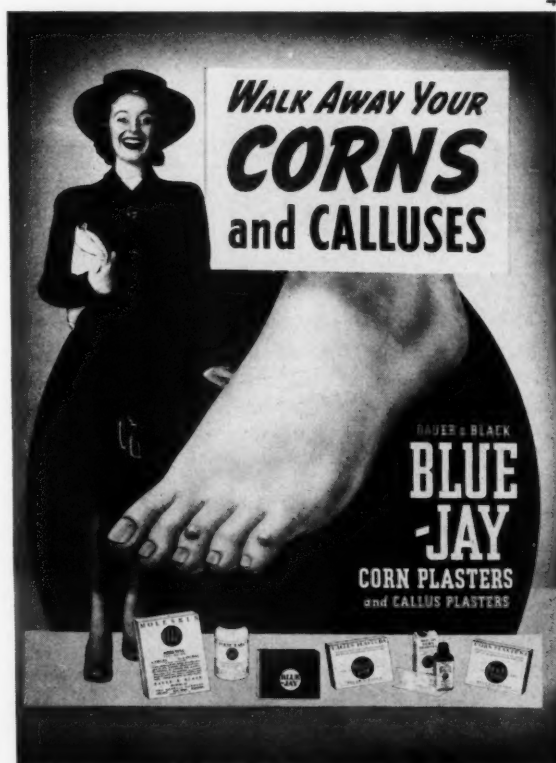
3

3. Humorous illustrations of old remedies and superstitions advertise Mail Pouch tobacco in windows and periodicals. 4. Blue-Jay window pieces make a definite tie-up with the themes used in space advertising.

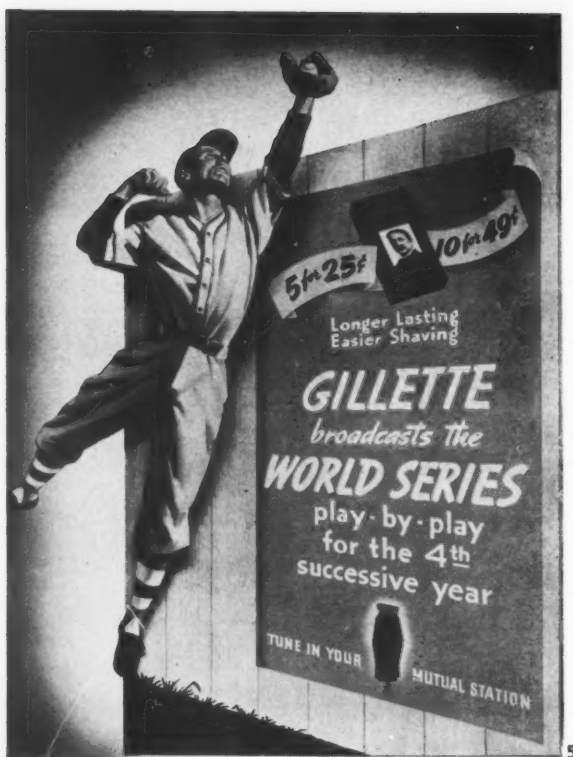
enabling the company to get a longer, continued use of window space in the better stores.

Another good example of keeping the reminder before the buying public for a longer time by supplying the dealer with something attractive to his customers, and therefore acceptable to him, is to be found in the Eveready posters which may be characterized as purely human interest. When it comes to a question of coordination, it sometimes happens that the tail wags the dog. Eveready posters of the type illustrated had the same quality that so many of the better *Saturday Evening Post* covers have possessed. For this reason they were used by retailers for long periods of time and were found to be so effective that several of the better ones were used as full-page advertisements in color, in national magazines.

Many good altruistic displays have been created in the last 10 years; altruistic in the sense that they furnish a keynote for a window display which permits the use of related merchandise in the window. An excellent example of how this can be done without losing the thread of the national appeal, as used in all forms of advertising, is to be found in the Ipana "Camera" display. For years Ipana has been selling the "Smile of Beauty." This particular display is consistent in that it sticks to this theme and yet it gives the dealer an opportunity logically to display cameras, films and developing services.



4



5. The Gillette Safety Razor Co. recognizes the value of dealer's window as an adjunct to radio advertising campaign and coordinating medium.

Regardless of what advertising men may theorize upon, the dealer knows that the display appeals to an audience that is on its feet and moving. It must be fast. This does not preclude the possibility of using enough copy to accomplish a sales job. In the main, however, the fast-acting poster qualities must be retained. The display used by Bauer & Black is a fast-moving display with product illustrations.

Swinging over to one of the extremes of this subject of coordination, we find the display functioning both as a reminder and as a device to sell another form of advertising. The illustration showing how the Gillette Safety Razor Co. has attempted to get increased following for their radio programs served to indicate the possibilities in this direction. After all, the radio is basically an instrument of entertainment. It is a good will builder. A display which accomplishes the dual purpose of reminding people of the product, and getting more listeners for the program, might be said to coordinate in the leading role. Because, relatively, displays are not costly, there is no reason for considering them of less importance. Anyone having any illusions as to the keen retail merchandiser's appraisal of value should try to get some space in one of the chain drug stores, for instance. Never has the opportunity to reach the public been so zealously guarded as the chain store merchandising men guard the space in their windows. The window is a primary medium because it reaches more people for less money, at a better place, than any other advertising medium. Perhaps sometime other advertising will be coordinated with window advertising; who knows? Unpredictable things have happened—even in displays!

Methods of Distributing Display Material

IN MANY cases a deterring factor in the path of store displays is the fear that the material will be wasted—a natural fear on the part of many advertisers. When it is realized how carelessly many retailers treat lithographed materials, it must be admitted that this is a genuine problem. Therefore, a discussion of the comparative merit and expense of various methods of distributing displays to dealers is in order.

There is waste circulation in every advertising medium. Window display is no exception. Its wastes occur mainly through failure of dealers to use the material, which in turn may be due to its being inappropriate for the product or the outlets, as well as the failure of the method chosen for distribution.

Here follows a list of these principal methods with a brief statement of various advantages and disadvantages.

1. Professional installation:

Certain organizations offer a nation-wide coverage through their affiliates. Cost averages about \$3 per window.

Advantages:

- Can be done according to photographs.
- Can be "spotted" by definite distribution plan.
- Can be definitely timed to a schedule.
- Can be "certified" and o.k.'d by dealers.
- Minimum of waste—"No installation, no pay."

Disadvantages:

- High expense (to cost of display must be added installation charge and expense of trim materials).
- Selection of dealers largely left to installation men.

2. Western Union messenger service:

Though this service has been suspended for the duration of the war, the Western Union Telegraph Co. plans to resume it when times become normal.

Through the independent offices of the company coverage is available of 5604 towns and cities throughout the United States. The company has a definite rate schedule, averaging 15¢ to 35¢ per call. To these costs must be added the shipping charges on the materials sent to the distribution points.

Advantages:

Makes possible guaranteed delivery, and setting up (but not installation in window) of displays. Simple installations are possible, such as affixing window pasters or transparencies, and setting up counter pieces.

Special selected areas, states or cities can be covered. Reports of calls may be obtained.

Special messages to dealers may be included.

Deliveries are dramatized by messenger service.

Deliveries may be to specifically selected dealers, or to a specified number in selected lines of business.

Disadvantages:

"Standardized" handling by young men with no merchandising experience or background.

Low cost necessitates speedy operation on part of messengers.

Delivery is assured, but not installation in first class stores.

3. Charging for displays:

In some lines, such as radio and refrigeration, for example, where specialty selling is done by the retailers, the manufacturers are comparatively few in number. This has made it possible for them to adopt a firm stand with regard to display materials, and their practice is to charge dealers for them, either individually or on a yearly fee basis. This is a far cry from the situation in staple lines, where frequently it is a practice to pay dealers for the use of their windows by means of "free goods." When dealers pay for display materials, it has two advantages: higher respect for the material, which insures intelligent use, and inducement for the manufacturer to invest in the finest type of displays, even though the quantity is likely to be smaller.

4. Using the advertiser's own organization:

Some larger advertisers have their own display crews, carefully trained both in installation and in the merchandising of the particular line, operating in all parts of the country.

Advantages:

Complete control of all aspects of situation.

Guarantee of installation strictly from advertiser's standpoint.

Excellent chance of inducing Class "A" dealers to use materials.

Disadvantages:

Adapted only to larger organizations.

Impossibility of working to a "timed schedule."

Constant overhead and resulting high costs.

Some smaller organizations, as well as many larger ones, insist on their regular salesmen including display installation as one of their duties. In addition to the advantages listed directly above, there is the added point of having the man who takes the order able to "sell" the dealer on using the display, also his using the display as an added sales point for his proposition, thus a help in obtaining the order. Furthermore, the display is the salesman's representative, present with the dealer at all times in the intervals between the salesman's calls.

But there is a disadvantage: Unless the salesman is thoroughly "sold" on the benefits to himself from time spent in display installations, that feature of his work is likely to be neglected in favor of immediate orders. Some concerns, realizing this, have adopted compensation plans which take that into consideration.

5. Shipping direct to dealers:

This is probably the most common and least expensive method. Frequently it is accomplished by means of a "broadside" with a reply card which dealers are asked to fill out and return, asking for the display.

Advantages:

A very economical method in actual outlay.

Opportunity can be presented by mail to dealers everywhere.

Disadvantages:

Few Class "A" dealers respond.

Some dealers send for but do not install material.

Little real control of situation for advertiser.

Slipshod or haphazard installations.

6. Shipping with merchandise:

Smaller pieces are frequently placed inside the cases, while larger ones are shipped in separate cartons with a consignment of goods. Sometimes the display is made part of a "deal," and included with a certain quantity of the merchandise.

Advantages:

Dealer has the actual merchandise advertised by the display.

Carrying charges reduced to minimum, because shipped with goods.

Disadvantages:

High percentage of waste due to jobber handling.

No intensive "merchandising" of the advertising.

Big buyers get too many; small buyers few or none.

Using Windows Effectively

by R. W. Ingram

OFTENTIMES it is apparent that the simple fundamentals of window display are overlooked perhaps inadvertently in an endeavor to achieve esthetic effects rather than to create buying impulses which culminate in the selling of merchandise.

In the drug field, particularly during the past several years, we have been experiencing a complete transition in the conception of displaying merchandise. There was a time when the retailer thought of his windows as a place in which to hang pictures and then glorify those pictures with elaborate crepe paper backgrounds which oftentimes detracted from the display sales appeal. But the writer believes that this era is gone forever and the window must serve a more practical function in showing a variety of the merchandise on sale in the store and afford suggestions for window shoppers.

An empty window never sold any merchandise—in fact does not even give a clue to the type of merchandise the store carries. However, window space is important

and its use must be considered in conjunction with the rental value of present-day drugstore locations. According to the government, the familiar phrase, "down at the corner drugstore," will justify it because a survey shows that 84 per cent of the country's drugstores are located on street corners where rentals are naturally higher than in the middle of the block. The landlord knows that the windows are valuable. In fact, it is obvious that the front of a store is worth more per square foot than the back. Consequently, the windows of a store are perhaps responsible for from a third to a half of a store's rent and they should be made to pay their rent through multiple display of a variety of items as against

1-2. These displays for Ipana show one of the present trends in drugstore window treatments. In order to make maximum use of limited space, mass arrangements are displayed in steps. Natural tie-ups such as dental products and beauty aids, dental products and kodak films are designed to create related item displays.





In order to help druggists build up a much neglected market, Bristol-Myers took all the related items in men's toiletries and designed a unit with as much sales appeal as possible. Below is an After-the-Bath unit, which is a departmental idea for the druggist to feature deodorants, lotions, manicure aids, hair brushes, face creams, etc. In this way, though Mum is given the spotlight, the display becomes a multiple item.

a limited display of a single item whose sales volume perhaps might not offset one-twentieth of the store's rent. Therefore, the window is the real entrance to the store. To be sure, the feet go in through the door, but the eyes of the customer go in through the window.

In expressing these views, we are naturally approaching the problem of window display from the dealer's standpoint and not from the manufacturer's standpoint. It is a dealer medium pure and simple and the manufacturer who puts the dealer first in the preparation of display material is the one who stands to profit through having the material used and thereby publicizing his products advantageously in conjunction with competitive and non-competitive products at the point-of-sale. The window belongs to the dealer and not to the manufacturer. This space is obtainable at the discretion of the dealer and is not a purchasable medium of advertising in standards of time and/or space such as publication, radio, car card and poster advertising.

In the process of creating window display ideas, a valuable lesson can be learned from walking through the pushcart districts of any large city or from observing the way merchandise is displayed at the vegetable market. The fellow who features only one product, perhaps potatoes or lemons, commits himself to only a limited market because everybody passing this display may not be in the market for potatoes or lemons at the particular time.

Conversely, the pushcart peddler, desirous of appealing to the masses, displays potatoes, carrots, cabbage, beets, spinach in conjunction with apples, oranges, bananas, etc. The point is, his objective is to appeal to the masses to the degree that everybody might desire some one or two items he has on display and in drawing their patronage he exposes them to the sale of one or more related



items. Confucius say, "Bird choose tree. Tree not choose bird." We paraphrase, "Customer choose store. Store not choose customer." Yes, customers choose stores where a variety of merchandise is on display.

The government further reveals that 65 per cent of all drugstores were found to be equipped with open display tables for interior mass display of merchandise. *Such displays were coincident with large volume of business!* With this overwhelming evidence favoring mass merchandise display to appeal to the varied preferences of the masses, it would certainly be poor business wisdom to buck the trend.

However, a big problem confronts all manufacturers who distribute their products through drugstores in obtaining good display push on their respective products. The trend in mass display is growing so fast that druggists, to offset limited depth of window, are building

steps in the window for height to gain more space in which to display merchandise. This naturally means smaller pictorial displays with powerful eye appeal and a dramatic selling idea to counteract the static arrangement of merchandise on display.

Large display pieces are today practically obsolete because abnormal size utilizes space which can be better devoted to display of more merchandise. A second illustration for this article is an example of how we are riding with the trend—Dental Health and Beauty Needs Display, the title of which implies that more than one product is on sale. Most dentifrice advertising is based on a beauty appeal and so what more natural tie-up than a display of beauty aids in conjunction with dental needs.

We go a step further, through pictorial suggestion in reminding passers-by that they might also need cameras and film as depicted in the display centerpiece and side cards. We show how the retailer can utilize this display material in a step window or in other words, the mass merchandise type of window.

To the same degree that two horses would pull a heavier load than one horse, tests have proved that a counter display of the same merchandise will make a window display more effective and so we furnish a counter tie-up display, with all window material.

Another illustration is an entirely different type of merchandising promotion—a departmental display idea not based on one product, but suggestive of related items for use by men—Men's Needs Departmental Display. We discovered that drugstores were neglecting a big

market in the sale of men's toiletries because the drugstores were catering primarily to cosmetic departments, baby departments, prescription departments, feminine hygiene departments and tobacco departments. In some measure the lack of drugstore appeal to men has forced men to purchase their toiletries at tobacco stores, at the railroad station newstand, in men's shops, and, in many cases, requested his wife to buy shaving cream or razor blades at the grocery store.

Our Men's Needs Display was designed to help the retail druggist recover this masculine business and build up a department catering to the needs of men who buy hair preparations, razors, blades, shaving cream, combs, brushes, talcum, lotions, etc.

Another winner is that illustrated for Mum—not just a Mum Display, but a selling idea—After-the-Bath Display. A departmental idea for the druggist to feature deodorants, depilatories, lotions, manicure aids, hair brushes, combs, face creams, powders, rouge, perfumes, etc. Actually it is a multiple idea display, to sell multiple items For the Bath, After the Bath, During the Day and At Evening.

Equally important as the display itself is the method of promoting use by the retailer. We have a splendid promotion device in the Bristol-Myers *Merchandiser* magazine published to give the druggist sales building ideas exemplified in the display offered free or if he has no need for the current display, we offer other worthwhile ideas to help the retailer make more customers, more sales and more profits.

Wartime Jobs of Counter Displays

by Merle D. Penney

IN war or in peace, counter displays have definite merchandising jobs to perform and sales objectives to reach. As a matter of fact, wartime duties mesh with and, in many cases, pyramid upon regular peacetime tasks.

Whether the message be designed to sell a product, or sell active participation in the war effort; whether its purpose be to introduce a new product, or to identify the regular product in a new wartime dress made necessary by priorities and bans; whether the desire is to spotlight health or stress conservation—counter displays reach prospects when they are product conscious and in a receptive, buying mood.

Shoppers who have entered a retail store are in that store to buy something. Standing in that store awaiting their turn at the counter, those shoppers represent potential customers in a most desirable and fertile frame of mind, from your standpoint. The purse is open and actual buying decisions are being made—there'll be

action—buying action—right away.

A counter display must first win a showing. To do so, it must immediately impress the storekeeper with the fact that it is a real sales aid, meriting a portion of his valuable "out front" display space. Then, once up on the dealer's counter, it must be so designed and executed that it will work on the sensibilities of shoppers in an orderly psychological approach, suggesting pick-up of the product, inviting inspection of that product, extolling product virtues, suggesting and illustrating product uses, dramatizing product superiority by picture, copy and, above all, urging its immediate purchase.

In addition to these two primary functions, counter displays have certain general functions to perform:

1. Remind the shopper of forgotten needs.
2. Develop an impulse purchase by shopper who entered the store with some other purchase in mind.
3. Supplement and complement other advertising by identifying the product to shoppers as the one they



1. Die-cut sections in this display permit insertion of three different size packages; price of each is given prominence on individual tabs. 2. Top of carton folds back to make background.

heard advertised on the radio, read about in a magazine or newspaper, or saw illustrated and described on the highways—on posters, car cards or window displays.

4. Undo competitive advertising in other media which has instilled a desire in shopper's mind for a competitive product, by last-minute persuasion that, after all, your product will give best results and greatest satisfaction.
5. Combat other point-of-purchases advertising sponsored by competing products.

While performing the primary and general functions, counter displays can be carrying out their specific assignment of one or more of the countless functions for which they may be especially designed. All such specific functions cannot be listed here, but the following are indicative:

- (a) Demonstrate the product. (b) Tell the price. (c) Help dealer sell related items. (d) Feature combination offers. (e) Outline special premium offers. (f) Describe a contest. (g) Sample the product. (h) Introduce a new product. (i) Illustrate a new use. (j) Feature a new package. (k) Distribute supplementary printed material. (l) Dramatize product trade mark. (m) Feature and glorify radio stars. (n) Illustrate and describe special wartime uses. (o) Demonstrate conservation methods.

There are many factors, including the functions enumerated above, which must of necessity influence decisions regarding specifications of displays for use on the vital counters of retail stores. The product itself is usually the first consideration. Others are: Kind and scope of

market; tie-in with general campaign; seasonal factors; distribution problems; attitude of retail outlets; change intervals; competitive conditions; budget; and the specific objective of that display piece.

Intelligently conceived and well-organized counter displays will perform several functions—they must, if they are to win dealer acceptance. However, too many tasks must not be assigned the display lest it fail to perform any function well.

Other characteristics must be kept constantly in mind in developing the display and they must be weighed with deliberation in order to establish properly the relative importance of each in the final makeup. Some of these are: Basic appeal; merchandising idea; art treatment; construction; extra or novel features; copy slant; economical production.

For instance, the copy on counter displays need not be as brief as copy used on posters and window displays—the viewer has a longer time in which to absorb the story and comprehend its implications. There should be a fast-reading identifying element, plus more leisurely copy and illustrations for the information of shoppers who may desire to know more about the product and its potentialities—what it will do, or what can be done with it.

There are many different kinds of counter displays. Most of them, however, will fall within a few general classifications.

For instance, there is the simplest type of all—the counter display card. This is a single-plane display which can be either square-cut or die-cut into some interesting and eye-arresting shape. It stands on the counter, either alone or in conjunction with an arrangement of

the product packages, bearing an illuminative and instructive printed or lithographed message.

A ramification of this single-plane display card is one having a number of product packages fastened to its face with rubber bands or metal clips or held by die-cut tabs, fitted into die-cut openings, etc. Product packages are attached before the card is shipped to the dealer and all the dealer has to do is to place the filled card on his counter. It's all ready to go right to work as a member of the dealer's sales force.

Another type of counter display which carries the

product to the dealer, is the combination shipping and display container. This type of display piece is filled with the product by the manufacturer and serves to protect the product in transit. When it arrives in the store, the dealer quickly makes a working display out of it simply by raising the lithographed cover into display position as he sets the display on the counter. The product is right there in the container, within easy reach of the shopper, in conjunction with an interesting and colorful product message.

Then there's the display piece designed around one or two of the actual product packages. Design and construction are such that attention is focused on the actual product packages—these packages being introduced as an integral part of the display itself, on special shelves, in die-cut openings, on supporting easels or by some other means combining display and product packages into a single coordinated unit.

Variations of these displays can be accomplished by:

- (a) Introducing an illusion of some action around those actual product packages—such as product pouring forth from the package—but without the expense of mechanical apparatus.
- (b) The inclusion of a pocket or some other device on the display to hold and offer descriptive booklets, folders, recipes, etc.
- (c) Illustrating and describing some sort of a combination deal.

A counter display that will be welcomed by any storekeeper is one which helps that dealer to sell related items. This can be accomplished either by providing space in or on the display for an actual sample of those related items, or the suggestion can be incorporated by copy or by illustrations.



3



3. Jumble display of bulbs. Two projecting sections of the front plane assimilate actual bulb cartons. Prominent display is given prices of various size bulbs on back plane. 4. These carry helpful and suggestive headlines which retailers are anxious to present.

Reproduction Quality

WORTHY OF THEIR DISTINCTIVE STYLE



HERE is a delicate job of reproduction handled with a finesse which could be achieved only by the finest of lithographic craftsmanship. And, like many others used by Philip Morris & Co., these striking displays were made by "U-S". When the reproduction problem is difficult . . . when the demands upon skill and experience are exacting . . . more and more advertisers are coming to rely on the facilities of "U-S" because here at "U-S" they get reproduction quality worthy of fine art.

THE UNITED STATES PRINTING & LITHOGRAPH COMPANY and DIVISIONS
Home Office 350 Beech St., Cincinnati, Ohio

5 Great "U-S" Plants STRATEGICALLY LOCATED

PRODUCING PACKAGING AND LITHOGRAPHED ADVERTISING OF HIGHEST QUALITY





5



6

5. The Princess Gelatine display container is convenient and attractive. Also used as a packer. It has an aperture in the cover which reveals the contents. Photo Robert Gair Co., Inc. 6. Phillips 3-dimensional counter display features two products and mentions a third. Photo The Forbes Lithograph Co.

Then, of course, there is the display that features or presents a premium. Such a display can carry a product package and illustrate the premium; or it can be built around the premium itself and carry illustrations and copy descriptive of the product and product uses. It may even present both the actual product package and the premium.

A counter display which presents an inviting jumble of product packages hardly ever fails to win instant approbation from the dealer. The open display basket is one such display, in which the product appears in an intriguing disorder. Sighting the product in this jumbled array, the shopper is prompted to pick up a package and examine it, without any qualms about disrupting an orderly counter arrangement. Getting the product into the shopper's hand is real productive salesmanship. Tests have proved that once the product is picked up and examined, the sale is more than half made. The display basket is shipped to the retailer folded flat in the shipping container with the product. The retailer quickly places the basket on the counter and tosses in the product, immediately creating an attractive and convincing sales presentation—an inviting jumble of the product against an eye-arresting picture and word story on the back and side panels of the display basket.

Another type of display well worthy of consideration is the novelty counter display, especially where the budget will permit the introduction of extra attention-getters in design or construction. For example, an interesting device or novelty attachment can be made a part of the display, providing the waiting shoppers with something to occupy their attention while other shoppers are being waited upon. As a matter of fact, that attention is not only occupied—it's concentrated upon that display and that product story, while the kid in them is given free rein in twisting or moving some device.

Light and motion present other opportunities of making counter displays more compelling from the stand-

point of snaring the attention of shoppers, although the cost factor of these features is something to consider. In many cases, light or motion is restricted to key locations, the balance of the displays being distributed without those features.

Size and shape, number of planes or elements and other construction ramifications must be governed to a great extent by the same factors which have influenced decisions regarding other display specifications. A few of these are: Type of product; class of retail outlets; prime objective; supplementary tasks; seasonal sales possibilities.

Surveys have been made among retailers to determine what sizes are most acceptable. The second installment of "What the Druggist Wants in Display," a survey by the Institute of Package Research, that was reported in the September 1940 issue of *Modern Packaging*, contains illuminating data along this line. For instance, this survey indicated that while the retailer is inclined to award more of his valuable counter space to displays which carry some of the product, effort must be made at all times to keep displays as compact as possible.

Unusual construction can, in many instances, add compelling attention value to the display. However, this must not be done at the expense of practicability. Storekeepers haven't the time or the patience to struggle with complicated, hard-to-set-up display pieces. Exigencies of a wartime economy are uncovering many additional jobs that counter displays can perform admirably and effectively.

New styles and types of packages are being born, almost daily, through necessity. These must be introduced to consumers and continually presented to them, identified as the good old standby of quality and value in its new wartime habiliments. Otherwise, instant product package identification that manufacturers have built up over the years (an important part of good-will) will become lost in the shuffle.

Stimulating and guiding intelligent purchases of consumer essentials and morale builders is another vital war-time job. Proper nutrition and vitamin habits, through proper eating and correct medication, are essential war-time factors upon which the public needs plenty of enlightenment. Counter displays can provide that instruction, dynamically and very persuasively.

Then there's that all-important matter of conservation—intelligent conservation of equipment and materials is being urged by the government day after day. This conservation may take many forms: Less use; more intelligent use; more careful use; better maintenance practices; substituting one product for another. Counter displays can carry word and picture demonstrations of those various phases of conservation to instigate cooperative action and do so right at the retail spot where those good intentions can be instantly implemented through proper purchases.

These are wartime jobs well-known trade marks can do and, in the doing, recognition and remembrance of those trade marks will be perpetuated throughout the entire war effort.

Counter displays are advertising—plus. This plus embraces all the advantages inherent in point-of-purchase

items, the most important of which is the fact that counter displays tell their story right out on the dealer's counter, within easy reaching distance of waiting shoppers.

Consider, also, the controls present in point-of-purchases advertising and selling effort. The first control is the power to concentrate selling effort in specific geographical sections with counter displays, of vital importance these days with the shifting centers of population due to war work. Also, with this medium, the intensity of the selling effort is controlled, according to amount and kind of buying traffic in various localities—controlled in two ways: Number of retail outlets selected in a given area; and amount and kind of display material distributed to that area. Another control is the privilege of choosing display areas according to type of buying power (income level, nationality, etc.) and of pointing up the appeal most likely to pay dividends in that type of market.

Properly conceived, intelligently developed and attractively executed counter displays will sell merchandise, urge cooperation in war activities or do any other assigned task; and they'll do so whether they are operating alone or as part of a complete campaign.

Corrugated Cases for Double Duty

by Paul C. Meelfeld

THE corrugated shipping-display box is *not* a post-Pearl Harbor packaging development. That it might be so identified by "strangers" is easily understandable; the desirability of features which from the start made it eminently suited to many shipping and merchandising situations has been accentuated by war conditions.

These features are: (1) economy and construction of non-critical materials; (2) ease in packing and handling; (3) adequate protection of merchandise; (4) simplified provision for conversion to effective display; (5) concentration of point-of-purchase message in a compact, self-contained display unit. Normal advantages of these features in the shipping-sales cycle are evident from both the manufacturers' and retailers' viewpoints.

For example, the manufacturer using this type of shipping box can give retailers merchandising aid without the expense of preparing separate display racks. Moreover, use of this help is automatically insured, inasmuch as it is an integral part of the shipment and involves no set-up or installation work on the part of the dealer. Mechanics of packing and shipping remain exceedingly simple, as when an ordinary shipping box is used, while the same protective cushioning against damage is assured. The very nature of the package encourages case-lot ordering and eliminates costly handling of smaller shipments; naturally the importance of this fac-

tor is considerably increased when the manufacturer wishes to introduce a new product or to promote a special offer. Finally, the corrugated shipping-display box serves as splendid reminder advertising and helps to build dealer repeat business.

In addition to sharing to a certain extent in these benefits, the retailer enjoys advantages particularly pertinent to his problems. Foremost among these is the

1. Heavy-duty brushes in a durable case which opens up as an effective counter piece.





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2. Handy container for counter spreads an array of screw drivers for the customer's choice. 3. Plumbing fixtures are kept in top-notch condition, exhibited in convenient, space-saving container. 4. Durable shipping case for chocolate is quickly transformed into handy counter piece. 5. Coffee shipping case is used to feature premium offer on dealers' counters. 6. Valuable display space inside container for Goblin assortment attracts youthful customers.



4



5

case with which the shipping-display box is converted for display. When the shipment is received, the retailer need only slit the sealing tape, make some simple folds along pre-scored lines to form a top display panel and bottom "streamer," and set the box on the counter; merchandise is neatly arranged, while sales copy and colorful illustrations are ready to help do their job. And, this job is considerable! Because the display "half" of the box attracts attention, delivers a strong message and invites inspection of merchandise, many of the preliminary clerking functions are performed. Sales are speeded and shopping is facilitated. Too, the dealer has a constant visual inventory of sales stock to help him in the daily routine and to serve as a reminder to re-order.

The varied problems of wartime selling in many consumer lines call for streamlined merchandising and shipping of the very type personified in the combination shipping-display box. Economy and cost-cutting? That certainly has become an increasingly important factor for manufacturers continuing to produce consumer goods. Case-lot ordering? The "squeeze" on existing transportation facilities made it absolutely essential that all shipping be made as efficient as possible. Inexpensive but effective merchandising aid? That certainly is essential to the maintenance of good dealer relationships. "Clerking" help in the form of an effective display? How else can the manufacturer give helpful recognition of the problem dealers face in manpower shortages? Yes, feature by feature the corrugated shipping-display box proves its right to a big place in the wartime as well as peacetime merchandising picture.

7. Zinsmaster's Zwieback Toast moved faster and in greater total volume when sold and displayed in smaller cases. 8. Glass packed products protected throughout their journey arrive ready to display in double-duty shipping container. 9. Brazil nuts shipped in bulk quickly sold and readily dispensed when displayed in this duplex box.



Variations in construction and design

While the basic features outlined above are inherent in all corrugated shipping-display boxes, variations are possible to permit emphasis on display, or to highlight other factors related to the particular product. For example, the interior of the box, those sections which form display panels, may be printed in one or several colors and may be die-cut to bring out an illustration. The merchandise "bin" section may be open to permit jumble arrangement, or partitioned, or arranged in tiers. Limitations on size, and to some extent shape, are sufficiently flexible to accommodate an almost unlimited number of product sizes and shapes. Juggling of these variables makes it possible to use this type of box for products of all kinds in practically any type of retail outlet.

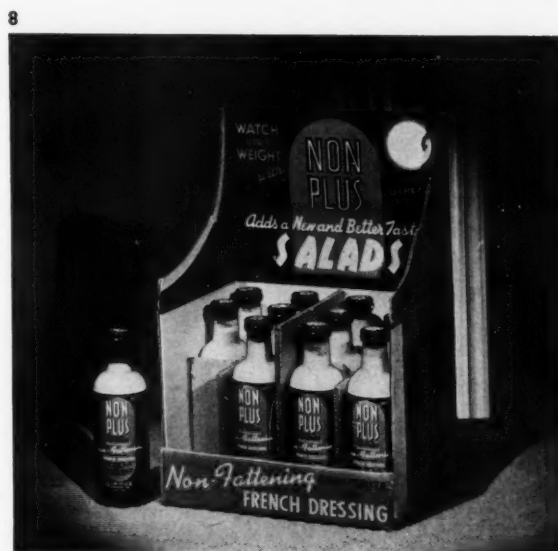
Floor stands

Floor stands and island displays are another type of display promotion with a practical side. They, too, fit into the wartime demand for functional merchandising aid. Primarily this is due to the fact that they enable the retailer to display merchandise stocks in conjunction with price data and other information of interest to the shopper; in the measure that these devices speed sales, they help alleviate the shortage of clerks. Because they are sturdy and have considerable space for merchandise, they are welcomed by retailers unable to obtain permanent display cases and counters, as well as by those facing the problem of suitable display for goods now being sold in larger unit sizes. As with the corrugated shipping-display box, they are adaptable to almost any condition—from merchandising a "family" line of products to promoting a special seasonal sale.

Three main types

From a mechanical standpoint, floor stands can be cataloged in three main types.

(1) **Corrugated floor displays**, which are either "island" and can be set any place on the floor, or





10

are "three-sided" to be placed with back to wall. These may also be flat-top, large bin, or tiered bin sections. Art illustrations are generally simple, with two or more different colors. This type is usually shipped flat, separate from merchandise.

(2) **Corrugated plus lithograph**, which are in construction essentially the same, but whose appearance is enhanced by mounted lithographed sheets carrying distinctive illustrations, charts or other art work calling for finer reproduction.

(3) **Lithographed on solid fibre board**, which are distinguished by the fact that all designs, copy

and illustrations are first lithographed on sheets which are then mounted on fibre board. Most expensive of the three types, their use is warranted where the type of product or outlet makes additional cost advisable.

Promotion must be practical

With the entire nation girded for supreme war effort, it is natural for all manufacturers selling through retail outlets to consider the practicality, along with the sales effectiveness, of any promotional material used. In the corrugated shipping-display box and floor stand many will find the helpful sales assistance for which they are searching.

11



10. Almost any type of merchandise sold in retail stores can utilize a floor dispenser for jumble display, for product in use or for customer selection. 11. This floor stand display employs a large waist-high bin to promote entire line with limited use of stock for display. Photos The Hinde & Dauch Paper Co.

Wood Displays and Cabinets

by Milton Weill

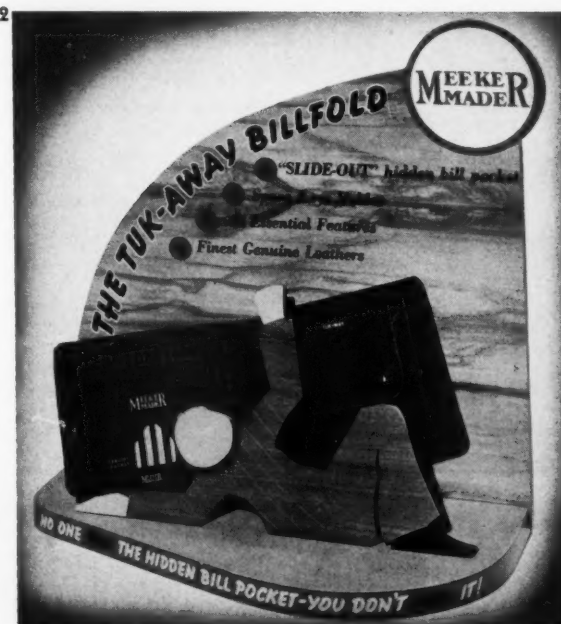
WITH war requirements taking away not only almost unlimited quantities of materials, but also the manpower of the nation, manufacturers and users of wooden counter displays are particularly fortunate. So far, at least, these silent salesmen may continue to display and sell the merchandise assigned to them—and even in the halcyon days of unlimited salesman power they were vastly important in every retail establishment.

With counter space doing its best in the absence of human salesmen, the comparatively permanent wooden silent salesman takes on a new importance. Customers need not wait until they can be "waited on" before they may examine the merchandise they want—it is there for them. Often action and stunt devices built into the display urge the customer to "try me" and effect a sale while the proprietor is busy elsewhere. Annoying delays are thus avoided. Therefore, also, both the storekeeper and the jobber and manufacturer can well be enthusiastic over the fact that they may still use wooden display set-ups. Stock control, though not as important as it once was (stock-maintenance being more important) many wooden containers show, at a glance, just how many of any given item have been sold or remain.

In normal times the wooden salesman was an important means of merchandising a new item, of re-introducing a product on which the sales had slowed down, and of building good-will.

New items—with the exception of military items—are not as numerous now and the moving of dead goods is not a prime consideration today so that the sheer functional service performed by wooden displays is of paramount importance. The permanence of wooden displays makes it possible to refurbish them from time to time, even if they have been out of use for a while. In the case of toiletries and cosmetics, combinations with mirrors and sample holders accessible to the customer, is of real importance.

Construction of wood displays is relatively simple—even a few can be produced if desired with no large initial cost of dies, for wood may be cut and shaped almost at will. However, where once clear acetate materials were used for window effects, glass is used today because of the restrictions effective against the use of clear acetate. Many far-sighted manufacturers planned in advance their complete year's program, and were therefore able to continue the use of displays which had always been such a fundamental part of their selling effort. This is even true in those instances where the product was so widely in demand that it was no longer a selling problem but rather a manufacturing problem. In those cases, obviously, the display was used not to help in the actual sale but rather to keep the product prominently before the ultimate user. In that way continued good-will is created and either the advertised



1. Natural wood finish and cabinet maker's workmanship combine to give the "Gift of a Lifetime" an appropriate setting. 2. Durable wood display exhibits actual product and features four sales points of Meeker's billfolds.

name of the product or the product itself is emphasized in the consumer's mind.

In the jewelry and cosmetic fields where wood displays, combined with glass, velvet coverings, decorative ornamentations, lighting effects, etc., have been effectively used, such counter displays continue to be important factors in the development of merchandising plans. In many cases, of course, new products, or new designs of old products, or additions to the line can be effectively introduced by the use of counter merchandise displays.

It is natural that a military motif should find its way into this field of merchandise counter displays at this time. Many such are now on the counters of all types of stores throughout the country featuring a variety of types of items. Especially is this true where the merchandise that is being featured on the display is of a military or naval nature. Some displays are using the red, white and blue color combinations as attention attractors. In others, the military note is the predominant feature of the entire display.

Effective use in some wood counter displays is made of designs made possible by the use of jig-saw equipment. A livelier note has thus been introduced into this wood display field. Comic figures done by jig-saw have in

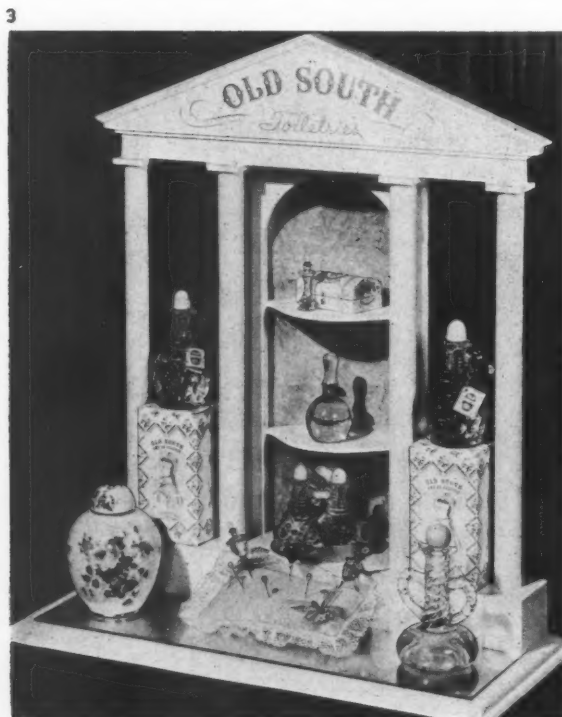
many cases been used as part of a display in order to give to the product featured more attention. A variety of other treatments is possible under this same classification. This treatment tends to liven up the display. It adds an element of softness and action in one form or other.

In some displays gold stamped ornaments are used in place of actual metal ornaments and trimmings. In other cases novelty wood decorations are adaptable, but since these, in most instances, are merely added trimmings, the inability to use them has not been a serious factor in the design of wood displays.

Mirrors in connection with wood displays are still used very effectively. They frequently form backgrounds reflecting the merchandise displayed in front of them. In other instances they have a more practical value in that they draw closer to the display the female customers who are interested in looking at themselves at the same time that they look at the merchandise that is being featured.

Despite the fact that some types of wood are difficult to obtain, generally speaking, wood displays are still available as an important aid in merchandising plans. Manufacturers may continue to look to this field for the effective display of their product on dealers' counters.

3. Wood display permits effective simulation of Doric architecture characteristic of the old South. Photo Rockford Showcase & Fixture Co. 4. Dignified and churchly atmosphere for religious jewelry is created by this handsome wood display piece. Photo Arrow Manufacturing Co., Inc.



Crepe Paper for Display and Backgrounds

by C. E. Wright

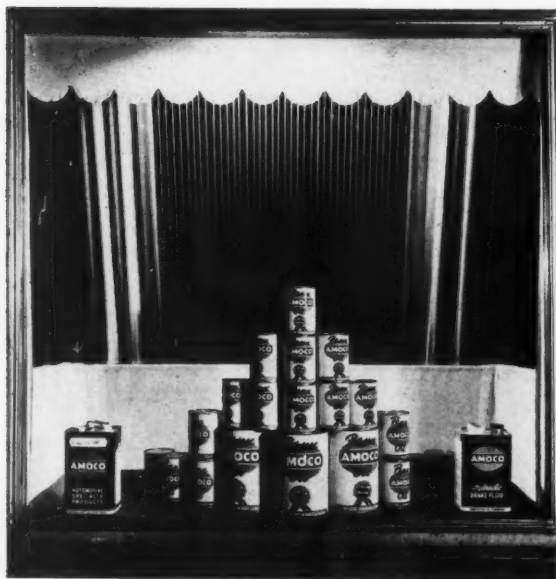
ALMOST every kind of paper has been used as a background for adding more sales punch to one or another kind of display. The vendor of racing sheets uses winning tote tickets as a background to advertise his wares. The Declaration of Independence is displayed against a background including a greatly enlarged copy of itself.

But the papers to be discussed here are only those most commonly used as the backgrounds of display. These may be plain, printed with stock designs, or printed special-to-order. They include the ever-popular crepe paper; plain or embossed metal foils; papers bearing designs to simulate leather, textiles or wood, or other patterns; flexible corrugated papers; and some types of fancy box papers.

Available materials

This multiplicity of background papers is most desirable. Variety is the essence of good display advertising as of any advertising. Accordingly, the aggressive manufacturer and the aggressive dealer familiarize themselves with all the wide range of papers, and use them to create constantly fresh and new decorative effects in window and other displays, always seeking the background papers that will do the job best. Many of the available materials combine very effectively—the less expensive crepes in their beautiful colors for large areas, the striking foils, flints, woods and leathers for accent—

1. *Crepe paper effectively sets off color and design of lithographed display piece and product.*



and the many types of corrugated papers for three-dimensional, structural effects.

For timeliness—and every good display is timely—there are printed panels and borders, large enough to dominate the background and give the entire display the seasonal touch that can be relied on to sell merchandise. There are also seasonal borders, in continuous rolls of attractive design, to tie the entire interior of the store in with seasonal or holiday spirit.

Corrugated papers now are available in a wide variety of surface textures with novelty embossings and herringbone effects, and not only with the conventional small flutes, but also with very striking wide flutes of classic beauty and exceptional strength. Further, non-rigid background papers, such as crepe paper, can be laminated to corrugated board for an even greater variety of unusual effects.

From the wide range of materials and printed designs now available for displays even those retailers and manufacturers with the most limited requirements can create scenic effects that up to a few years ago were possible only to the very large department store or to the manufacturer who purchases display materials in large quantities. Similarly, the manufacturer who purchases display materials on a special-to-order basis today can command display effects of greater beauty and stronger sales punch than ever before.

Crepe paper advantages

The principles explaining the purposes and power of these many different background papers in advertising and selling, and the criteria governing the selection and use of them are the same for each of them. Therefore, it is practical to write about all of them in terms of a single one, for example, crepe paper. For crepe paper is familiar to everyone; it is extremely adaptable, that is, capable of yielding an extremely wide variety of decorative effects, and it can be used to illustrate every basic principle and use of background papers except as a structural material.

Purpose of background

But first: "Why have these backgrounds?"

The answer will apply not only to the backgrounds of displays, but also to valances, trims, and panels for all sorts of units, including windows, show cases, counters, posts, ledges, demonstration tables, floor racks, and wall areas.

A satisfactory background will increase the effectiveness of a display because it:

- (1) Attracts attention, e.g., by providing color.
- (2) Ties in the merchandise or service being sold with the life of the prospective customer by creating an atmosphere that suggests the way to use or the

MAKE *Your* ADVERTISING

VICTORY . . . That's the product we've all got to sell, every minute of every day. Straight product sell is out . . . for the

duration. . . YOU can help sell VICTORY by selling the idea of full, wholehearted participation in all phases of war effort:

★
**SYSTEMATIC PURCHASE
OF WAR BONDS**

Pay roll deductions
Through banks
Loose change for stamps

★
CONSERVATION

Less Use
Better Use
Substitution
Sharing
Proper Care

★
MAINTAIN HEALTH

Nutrition
Vitamins
Immunization
First Aid Practice
Home Nursing Procedure
Accident Prevention

★
WAR ACTIVITIES

Enlistment in Armed Services
Air Raid Wardens
Plane Spotters
Control Center Operators
First Aiders and Home Nurses
Auxiliary Police and Firemen

★
SUSTAIN MORALE

Recreation and Entertainment
Education
Pride of Country
Superiority of American Way
American Achievements
Hope for the Future

YOUR valuable first-hand knowledge of individual and mass psychology;
YOUR appreciation of the public's reactions to certain appeals;
YOUR experience, ingenuity, vision and ability to sway public opinion and incite public action;
PUT 'EM TO WORK . . . on all your sales promotion material that reaches the American public IN THE HOME,
ON THE HIGHWAYS and IN RETAIL OUTLETS.

We can help you — our 80 years' experience is yours to command.

ON THE HIGHWAYS

We'll do our part
GULF

DRINK Coca-Cola
"Howdy friend"
24-sheet Posters
Wagon Posters
Station Posters
Car Cards

From here to Victory
It's CHESTERFIELD

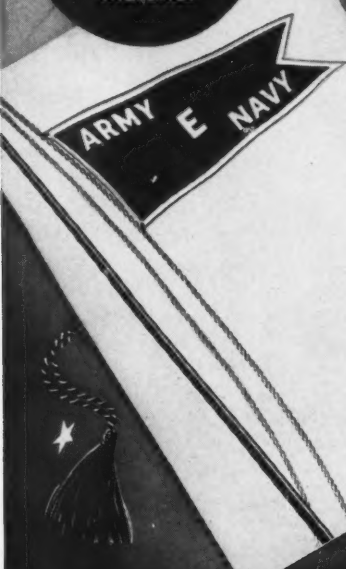
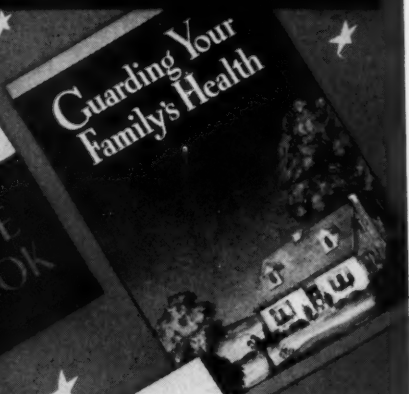
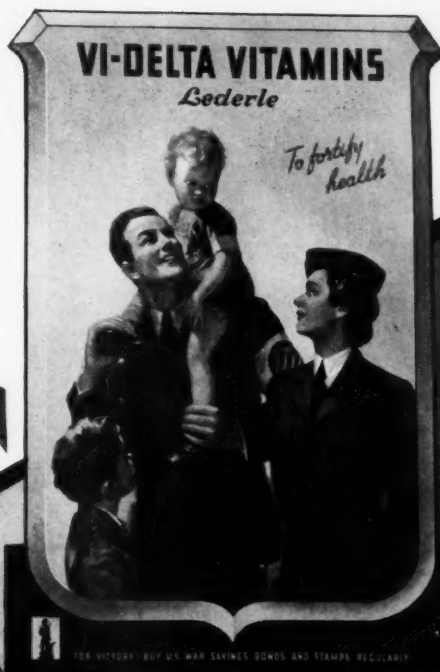
fight

AT POINT OF PURCHASE

IN THE HOME

Inside
Store Displays
Window Displays
Window Posters
Labels, Wrappers
and Cartons

Booklets
and Folders
Calendars
Package Inserts
Educational
Material



Tyer
RUBBER
COMPANY



FORBES



LITHOGRAPH CO.

NEW YORK

CHICAGO

CLEVELAND

ROCHESTER

P. O. BOX 513 • BOSTON



2. Johnnie Walker's jaunty personality and Beau Brummel costume find appropriate setting in crepe paper background.

place to use the product, and its origin or nature. This establishes a point of contact with the customer and suggests the purchase of the product to fill a need at Christmas time, on vacation, in the home, at the beach, or in any other manner that is timely and appropriate.

- (3) Enlarges the unit of display by extending the lithographed card or the actual merchandise in such manner that it seems to fill the whole window, counter, rack, or other display unit.
- (4) Focuses attention on the centerpiece—acts as a foil for the lithographed card or the merchandise in the window display.
- (5) Closes off the display from distractions which might otherwise divert the consumer's attention; for example, the background in a window shuts out movement in the interior of the store.

Desirable characteristics

To get results for which a good background is intended, the paper used should have as many as possible of the following characteristics:

1. **Color:** To attract attention, the colors should be striking, unusual. Also, there should be a *wide range* of colors; a well-known crepe paper manufacturer, for example, carries some 50 different colors in stock, which offer the decorator the opportunity to achieve unusual color combinations and dramatic effects.
2. **Texture:** Not only color but also sheen or surface interest is another characteristic that a background paper should have. Foil papers have brilliance and a mirror-like quality useful on many occasions. Papers carrying wood, textile, leather or other designs are sometimes just the thing. Crepe papers offer a texture similar to expensive fabrics, and are reversible; that is, they show a satin-like sheen on one side, a dull, soft, velvety texture on the other.
3. **Strength:** For ease of handling and permanence during life of display.
4. **Flexibility:** Also makes for ease in handling. To illustrate, visualize the manner in which a background paper like crepe can be used to wrap posts or other objects, turn corners, conform with or conceal an uneven surface, be compressed into a small space, or spread into a large one.

5. **Adaptability to many treatments:** This refers to special effects obtainable. Crepe paper, for example, can be pleated, draped, woven, and made into tubes; or it can be given a waved or rippled effect, and petal, fluted, or ruffled edges. Crepe can also be used to make fringes, nets, crushed festoons, Jacob's Ladders, lanterns, and decorative cut-out patterns as well as imitation plants and flowers of all kinds. This adaptability is a most desirable characteristic when it comes to creating an atmosphere to fit the product.

6. **Opacity:** Necessary to shut off outside interference which might otherwise disturb the onlooker. Crepe offers an advantage here in that it is opaque to vision, but translucent to light shining behind it. Also, this degree of translucency can be varied by the degree to which the crepe paper is stretched.

7. **Adjustability:** Because windows vary in size, the background paper sent with a display must be so planned that it can be adapted to various sizes and shapes of windows. The stretchability of crepe suggests its advantages in this connection.

8. **Universal familiarity and availability:** Important points when considering distribution of window displays on a national scale. Crepe paper in its wide range of 50 colors is available in almost every city and town, enabling the retailer, or the manufacturer's installation man, to get materials with a minimum amount of trouble for adding to a window. When the manufacturer is asking the retailer to install the display, it is of immense help that almost everyone has some knowledge of how to work with crepe.

9. **Ease of installation:** The strength, flexibility, and stretchability of crepe paper make it especially easy to manipulate.

10. **Low cost:** This factor, along with the general availability of crepe, makes it a good material for national advertisers to use in displays having nation-wide circulation.

Printed-to-order background paper

A background paper printed with the manufacturer's trade mark or other identifying copy brings special added advantages.

- 1) It enables the manufacturer to tie in his display closely with his general advertising, the trade mark on his product, letterhead, etc.
- 2) It makes for more attractive and more colorful displays because the background can be printed in special colors, to tie in with any theme color which the manufacturer may wish to feature.
- 3) Printed background papers provide an excellent means for creating just the right atmosphere to suit the product and the season of the year.

Finally, a retailer often changes only the merchandise or a lithographed card in a window and allows the background to remain—as almost everyone has observed many times. And, as long as a manufacturer's trade marked paper is left in the window, he continues to cash in on its benefits, even though the remainder of the display has been changed.

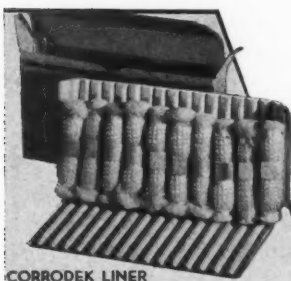
CORRODEK CONSERVES MATERIAL

with Safer Cushion-Packaging

Your products need greater protection in wartime . . . to withstand rough handling . . . to make every product count! Every reduction in waste is an increase in saleable output! And that calls for Corrodek, the improved corrugated. Strong . . . tough . . . resilient . . . it's the ideal, light-weight protection, with colorful beauty as well. Regular or die-cut shapes for special needs . . . for hand or machine packing. A rainbow of colors . . . and a great range of papers: glassine, greaseproof, parchment, bond, kraft, chip, treated papers . . . printed or plain.

Corrodek is a non-critical material that meets critical needs . . . a double purpose liner or a complete, cushioned package. Try this "Economy-Plus" material . . . judge its many good points.

Let a Sherman Packaging Engineer make suggestions to meet your needs. Or ask for free sample kit.



CORRODEK LINER
FOR DRUG PRODUCTS



CORRODEK CARTON
FOR BOTTLES



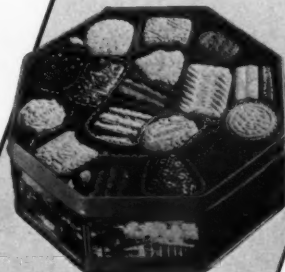
ONE PIECE CORRODEK
LINER FOR CRACKERS



CORRODEK PAN LINER
FOR CAKES



CORRODEK BOX LINER
FOR COOKIES



CORRODEK LINER
FOR SWEET GOODS



CORRODEK WRAP
FOR BOTTLES



CORRODEK LINER
FOR CANDY MINTS

SHERMAN
Paper Products Corp.

Dept. P3

Newton Upper Falls, Mass.

Los Angeles, California

BRANCHES: NEW YORK AND CHICAGO

Gentlemen: I certainly am interested
in safer packaging!

☐ Please send free sample kit.

☐ Have a Packaging Engineer call.

Name

Company

Street

City, State

Corrugated Display Materials

by Paul Thompson

WARTIME shortages in labor, material and transportation have increased the scope of display corrugated. The display industry, with its large percentage of young men, has suffered a great shrinkage in personnel and loss in efficiency through less skilled replacement labor. Saving of time has become increasingly important, calling for simpler point-of-sale displays and settings that require less time and less skill for installation.

The growing problem of transportation suggests the desirability of reducing bulk and weight in shipment, placing a premium on corrugated display materials that can be shipped in compact form. And war requirements having eliminated metals as well as some other materials for point-of-sale advertising, ingenuity steps in to substitute non-critical display corrugated for many new uses.

Types of display corrugated

For color and form—Display corrugateds fall into two main classes. Both are the so-called "single-face" type which combines two sheets of paper, one smooth and one corrugated, as contrasted with "double-face" which has two smooth outer sheets and a corrugated sheet in the middle. The most popular type of display

corrugated uses colored paper corrugated, on a plain backing sheet, to provide color and form. Its three-dimensional surface presents a great range of tones from highlights to shadows, almost kaleidoscopic in effect. From the structural point of view, its one-way rigidity saves time in installation, because it will stand upright with little or no tacking.

Corrugated papers used most widely today have $\frac{1}{4}$ -in. convex corrugations, available in rolls up to 6 ft. wide which meet practically all window requirements. Corrugations always run the width of the roll. Other colored corrugateds have flutings 1 in., 2 in. and 4 in. wide, some inverted (concave), others convex. Roll widths in these corrugateds run up to 8 ft wide.

This type, with colored corrugations, is most frequently used for color or surface alone, for a quick change of background used either horizontally or vertically. However, it can be secured with design as well. The stock may be printed before corrugating, or the corrugated stock itself may be processed by airbrushing or spraying, as illustrated in the Vogt window display.

For construction use or processed design—These papers place the corrugations on the back rather than the front, utilizing the corrugations only for their advantage

1. Corrugated displays like those shown below can carry war messages too. This complete display folds to ship in a carton 9 in. x 9 in. x 49 in. An inexpensive medium for good will and institutional copy.



THE WAR...

and Window Display

Naturally the WAR and VICTORY come first—in our small way we are endeavoring to do our part. And so our plant is now largely occupied with important Government business.

But—even in War Time we believe there is a place for our Peace Time business—*Window Display*.

We are still in this business and we welcome Window Display inquiries.—We ask only that you consider our urgent Government business and plan your displays so that rush Peace Time deliveries are not required.



BUY WAR BONDS

CREATIVE
LITHOGRAPHERS

KINDRED, MACLEAN & CO., INC.

43-01 TWENTY-SECOND STREET
LONG ISLAND CITY · Stillwell 4-7212

MEMBER POINT OF PURCHASE ADVERTISING INSTITUTE

PACKAGING CATALOG

575



2. A large setting quickly and easily installed. One piece of corrugated for background and columns, supported by columns. 3. Sprayed panel of corrugated provides catchy theme center for lithographed product units. Columns are integral part, supporting center unit. Photos Sherman Paper Products Corp.

of one-way rigidity. Paper which has a corrugated backing is rigid, self-standing, with a flat surface which will not wrinkle, wave or buckle in installation.

Although made and shipped in rolls, this type can be quickly changed into a rigid construction material by cutting a line across the corrugations along each edge of the roll, cutting through the corrugations but not touching the smooth surface. This forms a narrow panel on each side which, when folded back, makes the material fully rigid.

In the Victory Bond window, illustrated here, the two side signs are made from one piece of corrugated which has been cross-cut in this manner. The corrugations on the back of each sign run parallel to the floor. When the side panels on each sign are folded back, the sign becomes fully rigid and self-standing, without the use of any other support. While this cross-cutting can be done by the installation man, it is generally furnished cut to order by the manufacturer. This device enables material to be shipped in compact rolls and then transformed by the installer into a rigid display set or background.

Printing, processing and fabricating—A number of printing processes are available to the advertiser, depending upon quantity, design and color requirements. Rotogravure, offset or wallpaper presses may be used for roll printing in single and multiple color, including half-tone, benday and line techniques. Rolls can be printed up to 60 in. wide, with designs repeating at intervals up to 7 ft. Rolls can also be processed by the use of airbrush or spray gun. Sheets can be processed by silk screen in line or half-tone, or can be printed and corrugated in roll form and then cut into sheets as desired.

Practically any type of paper can be used for either the corrugated or the smooth side. Many special surface effects are available which include "flocking" to give a velvety effect, "fluttering" with metallic or mica particles to give sparkle, and lamination with crepe paper or fabrics. Special embossed finishes can be given to the paper. Corrugated paper can be die-cut like cardboard, to register with the printed material if desired. After die-cutting, materials can be shipped in roll form to be converted into three-dimensional display sets.

Methods of use

Backgrounds—Corrugated display papers are used most frequently for backgrounds, to provide settings for lithographed and merchandise displays. They provide an easy way to secure a change of background or to hide permanent window backgrounds. Corrugated can be easily cut with a pair of shears so that the installation man can readily make decorative effects such as scallops, waves, skylines, tree or bush cut-outs.

In addition to the many standard color and construction corrugateds, the advertiser has available a wide range of accessory or design materials. These include die-cut effects like icicles and picket fences; or printed materials like clouds, trees, ocean waves, ice-blocks, woodgrains and flowers.

Columns or side-wings made of corrugated are often used to accentuate lithographed displays. Properly used, they can add height, width or depth to the display settings as desired. They are helpful in fitting the display to the window.

For displaying merchandise—Probably no other method is as widely used for displaying merchandise as the versatile pedestal made of corrugated. Through the use of inexpensive, pedestal cap sets, a range of sizes in round and oblong pedestals can be made in any height, possessing the advantage of a material that can be shipped in compact form and quickly installed to fit varying needs. Merchandise can be displayed on the face of the pedestal as well as the top, by fastening it to the corrugated or by inserting cut-outs in the corrugated. Other methods for displaying merchandise include ledges, special platforms, shadow-boxes, sloping floors and horizontal rolls; all of which are easily constructed due to the one-way rigidity of corrugated. These devices, too, can be cut by the installer, or furnished pre-cut by the manufacturer.



**AMERICA'S FOREMOST VOLUME PRODUCER OF METAL DISPLAYS
HAS APPLIED ITS SKILLS AND RESOURCEFULNESS TO VICTORY.**

Here at the "Display Company" we have changed over from our normal peacetime operations to vitally needed materials of war. It has been done with maximum speed and confidence to meet the requirements of our country's armament program. Special emphasis is being put on the production of metal assemblies for all our forces, everywhere in the world.

IF IT'S SHEET METAL ARTICLES FOR WAR WORK — WE CAN HELP YOU.

ADVERTISING METAL DISPLAY CO.
WAR PRODUCTS DIVISION
CHICAGO, ILLINOIS

NEW YORK

• DETROIT •

MILWAUKEE

PACKAGING CATALOG 577

Complete displays—For the manufacturer who uses only limited quantities of displays, an economical answer is the complete display of corrugated, processed by silk screen or spray gun. In the central unit of the Vogt ice-cream display, for example, a single piece of corrugated has been sprayed with a message, the columns being an integral part that provide the necessary support, thus being utilitarian as well as decorative.

Another answer to displays in limited quantities is the use of stock pictorials available through display manufacturers. These can be furnished with or without the advertiser's imprint. They are particularly desirable for use with suggested window set-ups for related-item or mass window displays, where the window is to be installed by the retailer.

Such pictorial and accessory materials represent the type of material normally bought by the retailer, so that he is well acquainted with its value. Since these suggested set-ups feature a variety of merchandise with maximum sales coverage, they stand a particularly good chance of being used.

Interior wall and ledge displays—Many stores make good use of wall areas for valances and ledge advertisements. These can be printed or processed in roll form with a corrugated backing that prevents sagging.

Methods used to buy and ship displays

Complete set-up to installation house or retailer—In this case, the display and materials are shipped complete, with detailed instructions to the installation house or the retailer. Assembling may be done by the advertiser, the lithographer or manufacturer of display

materials. This method insures complete control over each display, as the installation house or retailer receives the lithographed items, dummies and all display materials at one time.

Drop shipments by display manufacturer

Most manufacturers of display materials will assemble and drop-ship these materials as ordered by the advertiser. This method relieves the advertiser of the detail of shipping and insures that the installation house or retailer will have the correct material and will not be handicapped by shortages in local stocks. Like the first method, it insures that the correct materials and colors are used, as called for by the designer in his original planning.

Bought by installation house—Under this method, lithographed displays and dummies are shipped to the installation house together with complete instructions on the use of other materials which may be purchased locally. If the indicated items should not be available locally, the installation house would have to make its own decision on the materials that could be substituted.

Manufacturers' advisory service—Leading manufacturers of display materials maintain staffs of men who have graduated from installation work and know the answers to all the problems of display. They are well acquainted with all the technical processes used in the manufacture of displays and accessories, and are well equipped to render both advisory and creative service, to suggest ideas and methods of carrying them out for both window and interior displays.

4



5



4. Corrugated backgrounds seem to increase size and impressiveness of this Wilson display.

5. Unusually effective and eye-catching is this handsome, lithographed display piece in eight colors. Background illustration is keyed to nation's war effort. 6. Advertising messages, elevated by corrugated accessories, also permit space for merchandise display.

6



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Buyers' Directory

ADHESIVES, ALL TYPES

Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Bingham Brothers Co., New York, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Findley, F. G. Co., The, Milwaukee, Wis.
Le Page's, Inc., Gloucester, Mass.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Midland Glue Products Co., Detroit, Mich.
Natl. Adhesives Div., Natl. Starch Products, Inc., New York, N. Y.
Paisley Products, Inc., New York, N. Y. & Chicago, Ill.
Sylvania Industrial Corp., New York, N. Y.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, AQUEOUS

(Starch, Dextrine, Flour)

Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Bingham Brothers Co., New York, N. Y.
Clark Stek-O Corp., Rochester, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Dewey & Almy Chemical Co., Cambridge B, Mass.
Findley, F. G. Co., The, Milwaukee, Wis.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Midland Glue Products Co., Detroit, Mich.
Natl. Adhesives Div., Natl. Starch Products, Inc., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Stein Hall Mfg. Co., Chicago, Ill.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, CELLULOSE

American Products Mfg. Co., New Orleans, La.
Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Auld, Hampton Inc., Newark, N. J.
Bingham Brothers Co., New York, N. Y.
Celanese Celluloid Corporation, New York, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Dispersions Process, Inc., New York, N. Y.
Eastman Kodak Co., Rochester, N. Y.
Findley, F. G. Co., The, Milwaukee, Wis.
Maas & Waldstein, Newark, N. J.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Midland Glue Products Co., Detroit, Mich.
Mitchell-Rand Mfg. Co., New York, N. Y.
Natl. Adhesives Div., Natl. Starch Products, Inc., New York, N. Y.
Naugatuck Chemical, Div. U. S. Rubber Co., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Peerless Roll Leaf Co., Inc., Union City, N. J.
Pyroxylin Products, Inc., Chicago, Ill.
Sylvania Industrial Corp., New York, N. Y.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, EMULSION TYPE

(Waxed Gums, Latex, Etc.)

American Products Mfg. Co., New Orleans, La.
Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Bakelite Corp., New York, N. Y.
Bingham Brothers Co., New York, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Dewey & Almy Chemical Co., Cambridge B Mass.
Dispersions Process, Inc., New York, N. Y.
Findley, F. G. Co., The, Milwaukee, Wis.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Natl. Adhesives Div., Natl. Starch Products, New York, N. Y.
Naugatuck Chemical, Div. U. S. Rubber Co., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Pyroxylin Products, Inc., Chicago, Ill.
Sylvania Industrial Corp., New York, N. Y.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, HOT AQUEOUS

(Gelatine, Flexible Glues, Etc.)

American Cyanamid Co., Plastics Div., New York, N. Y.
Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Bakelite Corp., New York, N. Y.
Bingham Brothers Co., New York, N. Y.
Clark Stek-O Corp., Rochester, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Findley, F. G. Co., The, Milwaukee, Wis.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Natl. Adhesives Div., Natl. Starch Products, Inc., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Sylvania Industrial Corp., New York, N. Y.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, HOT, NON-AQUEOUS

(Hot Melt, e.g., Heat Sensitive Resins or Hot Waxes)

American Cyanamid Co., Plastics Div., New York, N. Y.
American Products Mfg. Co., New Orleans, La.
Arabol Mfg. Co., The, New York, N. Y.
Arvey Corp., Jersey City, N. J.
Atlas Gum & Sizing Co., New York, N. Y.
Bakelite Corp., New York, N. Y.
Bingham Brothers Co., New York, N. Y.
Carbide & Carbon Chemicals Corp., New York, N. Y.
Catalin Corp., New York, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Dewey & Almy Chemical Co., Cambridge B, Mass.
Dispersions Process, Inc., New York, N. Y.
Findley, F. G. Co., The, Milwaukee, Wis.
International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Mitchell-Rand Mfg. Co., New York, N. Y.

National Adhesives Div., National Starch Products, Inc., New York, N. Y.
Naugatuck Chemical, Div. U. S. Rubber Co., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Pyroxylin Products, Inc., Chicago, Ill.
Seal, Inc., Shelton, Conn.
Stein Hall Mfg. Co., Chicago, Ill.
Union Paste Co., Hyde Park, Mass.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, MINERAL

(Silicate of Soda)

Arabol Mfg. Co., The, New York, N. Y.
Commercial Paste Co., The, Columbus, Ohio
Findley, F. G. Co., The, Milwaukee, Wis.
Manhattan Paste & Glue Co., Inc., Bklyn, N. Y.
Midland Glue Products Co., Detroit, Mich.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Philadelphia Quartz Co., Phila., Pa.
Williamson Adhesives, Inc., Chicago, Ill.

ADHESIVES, RESIN

(Hot & Cold Setting)

Alexander, Jerome, New York, N. Y.
American Cyanamid Co., Plastics Div., New York, N. Y.
American Products Mfg. Co., New Orleans, La.
Bakelite Corp., New York, N. Y.
Baker Oil Tools, Inc., Los Angeles, Calif.
Carbide & Carbon Chemicals Corp., Plastics Div., New York, N. Y.
Catalin Corp., New York, N. Y.
Central Process Corp., Forest Park, Ill.
Chemical Plastics, Inc., Minneapolis, Minn.
Dispersion Process, Inc., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Glyco Products Co., Inc., Bklyn, N. Y.
Goodrich, B. F. Co., The, Akron, Ohio
Heresite & Chemical Co., Manitowoc, Wis.
Irvington Varnish & Insulator Co., Irvington, N. J.
Lauxite Corp., Lockport, N. Y.
Maas & Waldstein Co., Newark, N. J.
Merrimac Div., Monsanto Chemical Co., Boston, Mass.
Metasap Chemical Co., Harrison, N. J.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.
Pierce & Stevens, Inc., Buffalo, N. Y.
Plaskon Co., Inc., Toledo, Ohio
Pyroxylin Products, Inc., Chicago, Ill.
Resinous Products & Chemical Co., The, Phila., Pa.
Rohm & Haas Co., Phila., Pa.
Schwab & Frank, Inc., Detroit, Mich.
Synvar Corp., Wilmington, Del.
United States Rubber Co., New York, N. Y.
Varcum Chem. Corp., Niagara Falls, N. Y.

AMPOULES, GLASS

Glass Industries, Inc., New York, N. Y.
Kimble Glass Co., Vineland, N. J.
Price, M. B. Associates, New York, N. Y.

APPLICATOR, CLOSURES

See Closures, Applicator

APPLICATORS, MEDICINAL

(Separate from Closure)

Armstrong Cork Co., Lancaster, Pa.
Celluplastic Corp., Newark, N. J.
Cournand, E. L. Inc., New York, N. Y.
Glass Industries, Inc., New York, N. Y.
Hychex Products, Chicago, Ill.
Kimble Glass Co., Vineland, N. J.
New England Collapsible Tube Co., Chicago, Ill.
Pennsylvania Glass Products Co., Pittsburgh, Pa.
Price, M. B. Associates, New York, N. Y.
Standard Specialty & Tube Co., New Brighton, Pa.
Victor Metal Products Corp., Bklyn, N. Y.
Wirz, A. H. Inc., Chester, Pa.

BAG TIES

Acme Steel Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Betner, Benj. C. Co., Devon, Pa.
Paramount Paper Products Co., Inc., Phila., Pa.
Royal, Thomas M. & Co., Phila., Pa.

BAGS, ANTI-TARNISH

(Cloth and Cotton-Lined Paper)

Andrews, P. L. Corp., Bklyn, N. Y.
Bemis Bro. Bag Co., St. Louis, Mo.
Cottonluxe Mfg. Co., New York, N. Y.
Eureka Mfg. Co., Inc., Taunton, Mass.
Paramount Paper Products Co., Inc., Phila., Pa.
Varey-Shea Bag Corp., Elizabeth, N. J.

BAGS, COMBINATION

Bemis Bro. Bag Co., St. Louis, Mo.
Betner, Benj. C. Co., Devon, Pa.
Central States Paper & Bag Co., St. Louis, Mo.
Comet Envelope & Paper Co., New York, N. Y.
Continental Bag Specialties Corp., New York, N. Y.
Crown Can Co., Phila., Pa.
Crystal Transparent Mfg. Co., Inc., New York, N. Y.
Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Interstate Folding Box Co., The, Middletown, Ohio
Mason Envelope Co., New York, N. Y.
Milprint, Inc., Milwaukee, Wis.
Oneida Paper Products, Inc., New York, N. Y.
Paramount Paper Products Co., Inc., Phila., Pa.
Reynolds Metals Co., Richmond, Va.
Royal, Thomas M. & Co., Phila., Pa.
Stecher-Traung Litho Corp., Rochester, N. Y.
Tower Envelope Co., New York, N. Y.
Weber, H. G. & Co., Inc., Kiel, Wis.

BAGS, FOIL

Bemis Bro. Bag Co., St. Louis, Mo.
Continental Bag Specialties Corp., New York, N. Y.
Dobeckmun Co., The, Cleveland, Ohio
Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Milprint, Inc., Milwaukee, Wis.
Neostyle, Inc., Chicago, Ill.
Oneida Paper Products, Inc., New York, N. Y.
Reynolds Metals Co., Richmond, Va.
Royal, Thomas M. & Co., Phila., Pa.
Shellmar Products Co., Mt. Vernon, Ohio
Union Bag & Paper Corp., New York, N. Y.

BAGS, GLASSINE & WAXED

American Paper Goods Co., The, Kensington, Conn.
Bemis Bro. Bag Co., St. Louis, Mo.
Betner, Benj. C. Co., Devon, Pa.
Central States Paper & Bag Co., St. Louis, Mo.
Central Waxed Paper Co., Chicago, Ill.
Comet Envelope & Paper Co., Inc., New York, N. Y.
Continental Bag Specialties Corp., New York, N. Y.
Cupples-Hesse Corp., St. Louis, Mo.
Dixie Wax Paper Co., Inc., Dallas, Tex.
Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
Herz, Alexander Co., Inc., New York, N. Y.
Interstate Folding Box Co., The, Middletown, Ohio
Mason Envelope Co., New York, N. Y.
Milprint, Inc., Milwaukee, Wis.
Moser Bag & Paper Co., The, Cleveland, Ohio
Neostyle, Inc., Chicago, Ill.
Newark Glassine Bag Co., Newark, N. J.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
Oneida Paper Products, Inc., New York, N. Y.
Paramount Paper Products Co., Inc., Phila., Pa.
Pollock Paper & Box Co., Dallas, Tex.
Royal, Thomas M. & Co., Phila., Pa.
St. Regis Paper Co., New York, N. Y.
Shellmar Products Co., Mt. Vernon, Ohio
Sweetnam, Geo. H. Inc., Cambridge, Mass.
Tower Envelope Co., New York, N. Y.
Traver Corp., Chicago, Ill.
Union Bag & Paper Corp., New York, N. Y.
U. S. Envelope Co., Springfield, Mass.
Wolf Bros., Phila., Pa.

BAGS, GLASSINE-LAMINATED & DUPLEX

American Paper Goods Co., The, Kensington, Conn.
Cupples-Hesse Corp., St. Louis, Mo.
Dobeckmun Co., The, Cleveland, Ohio
Milprint, Inc., Milwaukee, Wis.
Neostyle, Inc., Chicago, Ill.
Shellmar Products Co., Mt. Vernon, Ohio
U. S. Envelope Co., Springfield, Mass.
Westfield River Paper Co., Inc., Russell, Mass.

BAGS, KRAFT, GROCERY

Arkell & Smiths, Canajoharie, N. Y.
Atlanta Paper Co., Atlanta, Ga.
Birmingham Paper Co., Birmingham, Ala.
Brooklyn Standard Bag Corp., New York, N. Y.
Consolidated Paper Bag Co., Somerville, Mass.
Crown-Willamette Paper Co., San Francisco, Calif.
Crunden, Martin Mfg. Co., St. Louis, Mo.
Cupples Co., St. Louis, Mo.
Gaylord Container Corp., St. Louis, Mo.
Glickman, L. & Co., Bklyn, N. Y.
Interstate Bag Co., Walden, N. Y.
Kraft Bag Corp., New York, N. Y.
Lenoir Pad & Paper Co., Lenoir, N. C.
Pine-Land Bag Corp., Inc., Pascagoula, Miss.
Raymond Bag Co., Middletown, Ohio
St. Regis Paper Co., New York, N. Y.
Schorsch & Co., Inc., New York, N. Y.
Security Bag Co., The, (Lockland), Cincinnati, Ohio
Seinsheimer Paper Corp., Cincinnati, Ohio
Stevens, C. E. Bros., Inc., Baltimore, Md.
Superior-Lawrence Bag Co., Inc., New York, N. Y.

Triangle Paper Bag Co., Covington, Ky.
Triangle Paper Bag Mfg. Co., Cincinnati, Ohio
Union Bag & Paper Corp., New York, N. Y.
Wortendyke Mfg. Co., Richmond, Va.

BAGS, MULTIWALL HEAVY DUTY

Bagpak, Inc., New York, N. Y.
Bemis Bro. Bag Co., St. Louis, Mo.
Betner, Benj. C. Co., Devon, Pa.
Equitable Paper Bag Co., Inc., Long Island City, N. Y.
George & Sherrard Paper Co., New York, N. Y.
Hollingsworth & Whitney Co., Boston, Mass.
International Paper Prods., Div. of International Paper Co., New York, N. Y.
Reynolds Metals Co., Richmond, Va.
St. Regis Paper Co., New York, N. Y.
Union Bag & Paper Corp., New York, N. Y.
Wortendyke Mfg. Co., The, Richmond, Va.

BAGS, TEXTILE

Acme Burlap Bag Co., Bklyn, N. Y.
American National Bag & Burlap Co., Bklyn, N. Y.
Ames Bag Co., Selma, Ala.
Ames Harris Neville Co., San Francisco, Calif.
Arkell Safety Bag Co., New York, N. Y.
Augusta Bag & Burlap Co., Augusta, Ga.
Bader Bros. Bag Co., Detroit, Mich.
Bannon Bag Co., New Orleans, La.
Bemis Bro. Bag Co., St. Louis, Mo.
Blodt Bag Co., Houston, Tex.
Bosworth, M. M. Co., Memphis, Tenn.
Brown & Brown, Mobile, Ala.
Burka Bag Co. of Texas, Galveston, Tex.
Central Bag & Burlap Co., Chicago, Ill.
Chase, H. & L., Boston, Mass.
Chase Bag Co., New York, N. Y.
Cincinnati Industries, Inc., Cincinnati, Ohio
Continental Bag Specialties Corp., New York, N. Y.
Cottonluxe Mfg. Co., New York, N. Y.
Crescent Burlap Bag Co., New Orleans, La.
Crystal Bag Co., Chickamauga, Ga.
Erwin Bag Co., Houston, Tex.
Eureka Mfg. Co., Taunton, Mass.
Friedman Bag Co., Los Angeles, Calif.
Fulton Bag & Cotton Mills, Atlanta, Ga.
Gallie-King Bag Co., Houston, Tex.
General Bag Corp., Cleveland, Ohio
Grafflin Bag Co., Baltimore, Md.
Grimes Co., Denver, Colo.
Halsted, E. S. & Co., Inc., New York, N. Y.
Hardin Bag & Burlap Co., New Orleans, La.
Hutchinson Bag Co., Hutchinson, Kan.
Kent, Percy Bag Co., Inc., New York, N. Y.
Keystone Bag & Burlap Co., Lancaster, Pa.
King Bag Co., Cincinnati, Ohio
King Mfg. Co., Cincinnati, Ohio
Lawson, Jacob Bag Co., New York, N. Y.
Lone Star Bag & Bagging Co., Houston, Tex.
Maine Potato Bag Co., Caribou, Maine
Mente & Co., Inc., New Orleans, La.
Midland Bag Co., Inc., Cleveland, Ohio
Millhiser Bag Co., Richmond, Va.
Missouri Bag Co., St. Louis, Mo.
Morgan Bros., Richmond, Va.
National Bag Corp., New York, N. Y.
Neahr, M. J. & Co., Chicago, Ill.
Noon Bag Co., Portland, Ore.
Pacific Diamond H Bag Co., San Francisco, Calif.
Premier Bag Co., Inc., Lyndhurst, N. J.
Producers Dealers Supply Co., Boston, Mass.
Progressive Bag Co., Inc., New Haven, Conn.
Sacramento Bag Mfg. Co., Sacramento, Calif.

Addresses of companies listed appear on pages 622-630

Southern California Bag Co., Los Angeles, Calif.
 Southern States Bag Co., Jacksonville, Fla.
 Sprosty, Dan A. Bag Co., Baltimore, Md.
 Sterling Bag Co., Bklyn, N. Y.
 Tobias, Max N. Bag Co., New Orleans, La.
 Ullmann Bag Co., The, Detroit, Mich.
 Varey-Shea Bag Corp., Elizabeth, N. J.
 Virginia Carolina Chemical Co., Richmond Va.
 Walker Bag Co., Louisville, Ky.
 Werthan Bag Corp., Nashville, Tenn.
 Wertheimer Bag Co., Wilmington, Del.
 West Coast Bags, Inc., Los Angeles, Calif.
 Woodward Bag Co., Augusta, Ga.

BAGS, TRANSPARENT (Cellulosic)

American Paper Goods Co., The, Kensington, Conn.
 Central States Paper & Bag Co., St. Louis, Mo.
 Comet Envelope & Paper Co., Inc., New York, N. Y.
 Continental Bag Specialties Corp., New York, N. Y.
 Crystal Transparent Mfg. Co., Inc., New York, N. Y.
 Crystal Tube Mfg. Co., Chicago, Ill.
 Cupples-Hesse Corp., St. Louis, Mo.
 Dennison Mfg. Co., Framingham, Mass.
 Dobeckmun Co., The, Cleveland, Ohio
 Equitable Paper Bag Co., Inc., Long Island City, N. Y.
 Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
 Herz, Alexander Co., Inc., New York, N. Y.
 Humitube Mfg. Co., Peoria, Ill.
 Interstate Folding Box Co., The, Middletown, Ohio
 Mason Envelope Co., New York, N. Y.
 Menasha Products Co., The, Menasha, Wis.
 Milprint, Inc., Milwaukee, Wis.
 Modern Containers, Inc., Los Angeles, Calif.
 Moser Bag & Paper Co., Cleveland, Ohio
 Munson Bag Co., The, Cleveland, Ohio
 Neostyle, Inc., Chicago, Ill.
 Newark Glassine Bag Co., Newark, N. J.
 Newark Paraffine & Parchment Paper Co., Newark, N. J.
 Oneida Paper Products, Inc., New York, N. Y.
 Paramount Paper Products Co., Inc., Phila., Pa.
 Pollock Paper & Box Co., Dallas, Tex.
 Print-A-Tube Co., Passaic, N. J.
 Royal, Thomas M. & Co., Phila., Pa.
 Shellmar Products Co., Mt. Vernon, Ohio
 Sweetnam, Geo. H. Inc., Cambridge, Mass.
 Tower Envelope Co., New York, N. Y.
 Trans-Pac Services, Inc., New York, N. Y.
 Union Bag & Paper Corp., New York, N. Y.
 U. S. Envelope Co., Springfield, Mass.
 Visking Corp., The, Chicago, Ill.
 Wolf Bros., Phila., Pa.

BOTTLES, ALUMINUM

American Aluminum Ware Co., Newark, N. J.

BOTTLES, APPLIED COLOR

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Buck Glass Co., The, Baltimore, Md.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Coloroid Co., Inc., Cleveland, Ohio
 Glass Containers, Inc., Los Angeles, Calif.
 Hazel-Atlas Glass Co., Wheeling, W. Va.

Kimble Glass Co., Vineland, N. J.
 Liberty Glass Co., Sapulpa, Okla.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Swindell Bros., Baltimore, Md.
 Wheaton, T. C. Co., Millville, N. J.

BOTTLES, BEVERAGE

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Brockway Glass Co., Brockway, Pa.
 Buck Glass Co., The, Baltimore, Md.
 Glass Containers, Inc., Los Angeles, Calif.
 Hazel-Atlas Glass Co., Wheeling, W. Va.
 Liberty Glass Co., Sapulpa, Okla.
 Olean Glass Co., Olean, N. Y.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Swindell Bros., Baltimore, Md.

BOTTLES, COLORED

Anchor Hocking Glass Corp., Lancaster, Ohio
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Brockway Glass Co., Brockway, Pa.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Glass Containers, Inc., Los Angeles, Calif.
 Hazel-Atlas Glass Co., Wheeling, W. Va.
 Kimble Glass Co., Vineland, N. J.
 Maryland Glass Corp., Baltimore, Md.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Swindell Bros., Baltimore, Md.
 Wheaton, T. C. Co., Millville, N. J.

BOTTLES, FOOD PACKING

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Brockway Glass Co., Brockway, Pa.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Glass Containers, Inc., Los Angeles, Calif.
 Hazel-Atlas Glass Co., Wheeling, W. Va.
 Kimble Glass Co., Vineland, N. J.
 Olean Glass Co., Olean, N. Y.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.

BOTTLES, HAND MADE

Braun, W. Co., Chicago, Ill.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Glass Industries, Inc., New York, N. Y.
 Kimble Glass Co., Vineland, N. J.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Swindell Bros., Baltimore, Md.
 Wheaton, T. C. Co., Millville, N. J.

BOTTLES, MILK

Buck Glass Co., The, Baltimore, Md.
 Liberty Glass Co., Sapulpa, Okla.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.

BOTTLES, MINIATURE

Glass Industries, Inc., New York, N. Y.

BOTTLES, PAPER (MILK)

See Containers, Paper (Milk)

BOTTLES, PROPRIETARY & PRESCRIPTION

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Brockway Glass Co., Brockway, Pa.
 Buck Glass Co., The, Baltimore, Md.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Glass Containers, Inc., Los Angeles, Calif.
 Hazel-Atlas Glass Co., Wheeling, W. Va.
 Kimble Glass Co., Vineland, N. J.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Swindell Bros., Baltimore, Md.
 Wheaton, T. C. Co., Millville, N. J.

BOTTLES, TOILET, PERFUME, COSMETIC

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Ball Brothers Co., Muncie, Ind.
 Braun, W. Co., Chicago, Ill.
 Brockway Glass Co., Brockway, Pa.
 Carr-Lowrey Glass Co., Baltimore, Md.
 Glass Containers, Inc., Los Angeles, Calif.
 Glass Industries, Inc., New York, N. Y.
 Greene's Ceramic Products Co., Inc., Sebring, Ohio
 Hamilton, J. T. & A. Co., Pittsburgh, Pa.
 Hazel-Atlas Glass Co., Wheeling, W. Va.
 Kimble Glass Co., Vineland, N. J.
 Maryland Glass Corp., Baltimore, Md.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Swindell Bros., Baltimore, Md.
 Wheaton, T. C. Co., Millville, N. J.

BOX BOARD, ASPHALT LINED

Butterfield-Barry Co., Inc., The, New York, N. Y.
 Consolidated Paper Co., Monroe, Mich.
 Empire Box Corp., Garfield, N. J.
 Fibreboard Prods., Inc., San Francisco, Calif.
 Gardner-Richardson Co., The, Middletown, Ohio
 Jaypaco Co., New York, N. Y.
 Lowe Paper Co., Ridgefield, N. J.
 Morris Paper Mills, Chicago, Ill.
 Ohio Boxboard Co., The, Rittman, Ohio
 Rexford Paper Co., Milwaukee, Wis.
 Salwen, Joe Paper Co., New York, N. Y.
 Waldorf Paper Products Co., St. Paul, Minn.

BOX BOARD, CLAY-COATED

American Coating Mills, Inc., Elkhart, Ind.
 Bradner Smith & Co., Chicago, Ill.
 Butterfield-Barry Co., Inc., The, New York, N. Y.
 Champion Paper & Fibre Co., The, Hamilton, Ohio
 Container Corp. of America, Chicago, Ill.
 Eddy Paper Corp., Chicago, Ill.
 Gardner-Richardson Co., The, Middletown, Ohio
 Jaypaco Co., New York, N. Y.
 Keller-Dorian Corp., New York, N. Y.
 Lebanon Paper Box Co., Lebanon, Pa.
 Lowe Paper Co., Ridgefield, N. J.

National Folding Box Co., New Haven, Conn.
Salwen, Joe Paper Co., New York, N. Y.

BOX BOARD, FOLDING & SET-UP

Albia Box & Paper Co., Troy, N. Y.
Alton Box Board Co., Alton, Ill.
American Box Board Co., Grand Rapids, Mich.
American Coating Mills, Inc., Elkhart, Ind.
Andrews, O. B. Co., Chattanooga, Tenn.
Bird & Son, Inc., East Walpole, Mass.
Butterfield-Barry Co., Inc., The, New York, N. Y.
Carolina Paper Board Corp., Charlotte, N. C.
Carthage Paper Makers, Inc., Carthage, N. Y.
Central Fibre Products Co., Chicago, Ill.
Chemical Paper Mfg. Co., Holyoke, Mass.
Chesapeake Paperboard Co., The, Baltimore, Md.
Columbia Box Board Mills, Inc., Chatham, N. Y.
Consolidated Paper Co., Monroe, Mich.
Container Corp. of America, Chicago, Ill.
Continental Paper Co., Ridgefield Park, N. J.
Cornell Wood Products Co., Chicago, Ill.
Clifton Paper Board Co., Clifton, N. J.
Eddy Paper Corp., The, Chicago, Ill.
Empire Box Corp., Garfield, N. J.
Federal Paper Board Co., Inc., Bogota, N. J.
Fibreboard Products, Inc., San Francisco, Calif.
Fleming & Son, Inc., Dallas, Tex.
Fort Orange Paper Co., Castleton-on-Hudson, N. Y.
Franklin Board & Paper Co., The, Franklin, Ohio
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
Hummel & Downing Co., Milwaukee, Wis.
Hummel-Ross Fibre Corp., Hopewell, Va.
Inland Container Corp., Indianapolis, Ind.
Jaypaco Co., New York, N. Y.
Lawless Bros. Paper Mills, Inc., E. Rochester, N. Y.
Liberty Paperboard Co., The, Steubenville, Ohio
Lowe Paper Co., Ridgefield, N. J.
Mac Andrews & Forbes Co., Camden, N. J.
Mac Sim Bar Paper Co., Otsego, Mich.
Manchester Board & Paper Co., Richmond, Va.
McEwan Bros., Inc., Whippany, N. J.
Menasha Products Co., The, Menasha, Wis.
Michigan Carton Co., Battle Creek, Mich.
Mobile Paper Mill Co., Mobile, Ala.
Morris Paper Mills, Chicago, Ill.
Natick Box & Board Co., Natick, Mass.
National Folding Box Co., New Haven, Conn.
Nelson, B. F. Mfg. Co., Minneapolis, Minn.
New Haven Pulp & Board Co., New Haven, Conn.
Newark Boxboard Co., Newark, N. J.
Ohio Boxboard Co., The, Rittman, Ohio
Ontonagon Fibre Corp., Ontonagon, Mich.
Queen City Paper Co., The, Akron, Ohio
Robertson Paper Box Co., Montville, Conn.
Salwen, Joe Paper Co., New York, N. Y.
Schmidt & Ault Paper Co., York, Pa.
Smealie & Voorhees, Inc., Amsterdam, N. Y.
Sonoco Products Co., Garwood, N. J.
Southern Kraft Div., International Paper Co., New York, N. Y.
Strange, John Paper Co., Menasha, Wis.
Sutherland Paper Co., Kalamazoo, Mich.
Tennessee Paper Mills, Chattanooga, Tenn.
Toronto Paper Mfg. Co., Toronto, Ohio.
United Paperboard Co., New York, N. Y.
Waldorf Paper Products Co., St. Paul, Minn.

BOX BOARD, METALLIC-COATED

American Coating Mills, Inc., Elkhart, Ind.
Bradner Smith & Co., Chicago, Ill.
Butterfield-Barry Co., Inc., The, New York, N. Y.
Champion Paper & Fibre Co., The, Hamilton, Ohio
Dennison Mfg. Co., Framingham, Mass.
Jaypaco Co., New York, N. Y.
Keller-Dorian Corp., New York, N. Y.
Lowe Paper Co., Ridgefield, N. J.
Matthias Paper Corp., Phila., Pa.
McLaurin-Jones Co., Brookfield, Mass.
Miller Paper Co., New York, N. Y.
Salwen, Joe Paper Co., New York, N. Y.

BOX BOARD, MOISTUREPROOF & GREASEPROOF

American Coating Mills, Inc., Elkhart, Ind.
Butterfield-Barry Co., Inc., New York, N. Y.
Container Corp. of America, Chicago, Ill.
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
Inland Container Corp., Indianapolis, Ind.
Lebanon Paper Box Co., Lebanon, Pa.
Lowe Paper Co., Ridgefield, N. J.
Menasha Products Co., The, Menasha, Wis.
Morris Paper Mills, Chicago, Ill.
National Folding Box Co., New Haven, Conn.
Ohio Boxboard Co., The, Rittman, Ohio
Salwen, Joe Paper Co., New York, N. Y.

BOXES, CORRUGATED & SOLID FIBRE

American Box Board Co., Grand Rapids, Mich.
American Coating Mills, Inc., Elkhart, Ind.
Anderson Box & Basket Co., New York, N. Y.
Ashtabula Corrugated Box Co., The, Ashtabula, Ohio
Bird & Son, Inc., East Walpole, Mass.
Carpenter Container Corp., Bklyn, N. Y.
Consolidated Paper Co., Monroe, Mich.
Container Corp. of America, Chicago, Ill.
Continental Container Corp., Bklyn, N. Y.
Crook Paper Box Co., Kansas City, Mo.
Eddy Paper Corp., Chicago, Ill.
Eggers O'Flying Co., Omaha, Nebr.
Excelsior Paper Specialties Co., New York, N. Y.
Federal Container Co., Phila., Pa.
Fibreboard Prods., Inc., San Francisco, Calif.
Fort Wayne Corrugated Paper Co., Fort Wayne, Ind.
Gair, Robert Co., Inc., New York, N. Y.
Gaylord Container Corp., St. Louis, Mo.
Grand City Container Corp., New York, N. Y.
Hankins Container Co., Cleveland, Ohio
Hinde & Dauch Paper Co., The, Sandusky, Ohio
Hollywood Paper Box Div. The Flintkote Co., Hollywood, Calif.
Inland Container Corp., Indianapolis, Ind.
Keystone Box Co., Pittsburgh, Pa.
Kress, F. J. Box Co., Pittsburgh, Pa.
Maryland Container Co., Baltimore, Md.
National Container Corp., Long Island City, N. Y.
National Metal Edge Box Co., Phila., Pa.
National Paper Box Co., Kansas City, Mo.
Nelson, B. F. Mfg. Co., Minneapolis, Minn.
New England Box Co., Greenfield, Mass.
Ohio Boxboard Co., The, Rittman, Ohio
Ottawa River Paper Co., The, Toledo, Ohio
Owens-Illinois Glass Co., Toledo, Ohio
Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Pollock Paper & Box Co., Dallas, Tex.
St. Regis Paper Co., New York, N. Y.

Transcontinental Container Corp., Corona, L. I. N. Y.
U. S. Corrugated Fibre Box Co., Indianapolis, Ind.
Waldorf Paper Products Co., St. Paul, Minn.

BOXES, FANCY WOOD

Anderson Box & Basket Co., New York, N. Y.
Arrow Mfg. Co., Inc., Hoboken, N. J.
Autokraft Box Corp., Hanover, Pa.
Eureka Mfg. Co., Inc., Taunton, Mass.
Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
Mele Mfg. Co., New York, N. Y.
New England Box Co., Greenfield, Mass.
Nicoll & Co., San Francisco, Calif.
Nussbaum Novelty Co., Berne, Ind.
Parfait Powder Puff Co., Inc., Chicago, Ill.
Peterson Bros., Chicago, Ill.
Pilliod Cabinet Co., The, Swanton, Ohio
Schunack, C. E. Inc., Meriden, Conn.
Smith, S. K. Co., The, Chicago, Ill.
Stiles, H. A. & Co., Boston, Mass.
Trilsch, Oscar Co., Whitestone, N. Y.
Warner Bros. Co., Bridgeport, Conn.

BOXES, LEATHERETTE

Apex Paper Box Corp., Chicago, Ill.
Arrow Mfg. Co., Inc., Hoboken, N. J.
Beggs & Graham, Phila., Pa.
Chaspec Mfg. Co., New York, N. Y.
Consolidated Box Co., Inc., Tampa, Fla.
Deisroth, W. H. Co., Inc., Phila., Pa.
Dennison Mfg. Co., Framingham, Mass.
Ehlbert Products, Chicago, Ill.
Eureka Mfg. Co., Inc., Taunton, Mass.
Farrington Mfg. Co., Boston, Mass.
Fleisig, H. Inc., New York, N. Y.
Globe Paper Box Mfg. Co., St. Paul, Minn.
Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
Howell, F. M. & Co., Elmira, N. Y.
Leominster Paper Box Co., Leominster, Mass.
Lindley Box & Paper Co., Marion, Ind.
Lorscheider-Schang Co., Inc., The, Rochester, N. Y.
Mason Box Co., The, Attleboro Falls, Mass.
National Paper Box Co., Kansas City, Mo.
Neumann, Robert Co., The, Cincinnati, Ohio
Old Dominion Box Co., Charlotte, N. C.
Pictorial Paper Package Corp., Aurora, Ill.
Pilliod Cabinet Co., The, Swanton, Ohio
Schmidt, Henry & Bro., Inc., Phila., Pa.
Schulz, A. Geo. Co., Milwaukee, Wis.
Schunack, C. E., Inc., Meriden, Conn.
Smith, S. K. Co., The, Chicago, Ill.
Star Case Co., The, New York, N. Y.
Trilsch, Oscar Co., Whitestone, N. Y.
Warner Bros. Co., Bridgeport, Conn.
Weinman Bros., Chicago, Ill.

BOXES, MAILING

Beggs & Graham, Phila., Pa.
Brooks & Porter, Inc., New York, N. Y.
Calumet Carton Co., Harvey, Ill.
Campbell Box & Tag Co., South Bend, Ind.
Casco Paper Box Co., Inc., Portland, Me.
Clover Paper & Transparent Boxes, New York, N. Y.
Crook Paper Box Co., Kansas City, Mo.
Cross Paper Products Corp., New York, N. Y.
Deisroth, W. H. Co., Inc., Phila., Pa.
Electric City Box Co., Buffalo, N. Y.
Estes, E. B. & Sons, Inc., New York, N. Y.
Fibreboard Products, Inc., San Francisco, Calif.
Flashfold Box Corp., Ft. Wayne, Ind.
Fleisig, H. Inc., New York, N. Y.
Fox, C. J. Co., The, Providence, R. I.

Addresses of companies listed appear on pages 622-630

Frankenberg Bros., Inc., Columbus, Ohio
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
 Gates Paper Co., Ltd., The, Los Angeles, Calif.
 Gereke-Allen Carton Co., St. Louis, Mo.
 Henry, Ira L. Co., Watertown, Wis.
Hinde & Dauch Paper Co., Sandusky, Ohio
 Howell, F. M. & Co., Elmira, N. Y.
 Indianapolis Paper Container Co., Indianapolis, Ind.
 International Mailing Tube & Wrapper Co., Long Island City, N. Y.
 Kalamazoo Paper Box Co., Kalamazoo, Mich.
 Keystone Box Co., Pittsburgh, Pa.
 Kiernan-Hughes Co., Jersey City, N. J.
 Lindley Box & Paper Co., Marion, Ind.
Mason Box Co., The, Attleboro Falls, Mass.
Michigan Carton Co., Battle Creek, Mich.
Miller, Walter P. Co., Inc., Phila., Pa.
 Myers, J. & P. B. Inc., Jersey City, N. J.
National Folding Box Co., New Haven, Conn.
 National Metal Edge Box Co., Phila., Pa.
 National Paper Box Co., Kansas City, Mo.
 Nelson, B. F. Mfg. Co., Minneapolis, Minn.
 Neumann, Robert Co., The, Cincinnati, Ohio
Ohio Boxboard Co., The, Rittman, Ohio
 Old Dominion Box Co., Charlotte, N. C.
 Paper Package Co., Indianapolis, Ind.
 Pharmacy Paper Box Co., Chicago, Ill.
 Pictorial Paper Package Corp., Aurora, Ill.
 Pohlig Bros., Richmond, Va.
 Pollock Paper & Box Co., Dallas, Tex.
Ritchie, W. C. & Co., Chicago, Ill.
 Schmidt, Henry & Bro., Inc., Phila., Pa.
 Schoettle, Edwin J. Co., Phila., Pa.
 Schulz, A. Geo. Co., Milwaukee, Wis.
 Schunak, C. E. Inc., Meriden, Conn.
 Seaman Box Co., Inc., New York, N. Y.
 Sears, Merle Paper Box Co., Danville, Ill.
Shoup-Owens, Inc., Hoboken, N. J.
 Shuttleworth Carton Co., Inc., New York, N. Y.
 Stein, A. & Co., Chicago, Ill.
Sutherland Paper Co., Kalamazoo, Mich.
 Taylor Box Co., Providence, R. I.
 Waldorf Paper Products Co., St. Paul, Minn.
Warner Brothers Co., The, Bridgeport, Conn.
 Wilkata Folding Box Co., Kearney, N. J.
 Wilson Paper Box Co., Inc., Richmond, Va.
 Wolverine Carton Co., Grand Rapids, Mich.
 Young, Douglas Inc., Pawtucket, R. I.
 Young, Everett F. Co., Providence, R. I.

BOXES, METAL, COVERED *(Fabric, Leatherette, Etc.)*

Arrow Mfg. Co., Inc., Hoboken, N. J.
Eureka Mfg. Co., Inc., Taunton, Mass.
 Farrington Mfg. Co., Boston, Mass.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
 Hudson, H. L. Co., The, Bklyn, N. Y.
 National Paper Box Co., Kansas City, Mo.
 Seaman Box Co., Inc., New York, N. Y.
 Smith, S. K. Co., The, Chicago, Ill.

BOXES, METAL EDGE

Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
 National Metal Edge Box Co., Phila., Pa.
 Wolverine Carton Co., Grand Rapids, Mich.

BOXES, METAL SPECIALTIES *(For Mascara, Cosmetics, Compacts, Etc.)*

Advertising Metal Display Co., Chicago, Ill.
 Aluminum Co. of America, Pittsburgh, Pa.
 American Aluminum Ware Co., Newark, N. J.

Beggs & Graham, Phila., Pa.
 Clark, J. L. Mfg. Co., Rockford, Ill.
Crown Can Co., Phila., Pa.
 Ellis, George D. & Sons, Inc., Phila., Pa.
 Farrington Mfg. Co., Boston, Mass.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
 Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
 Hudson, H. L. Co., The, Bklyn, N. Y.
 Majestic Metal Specialties, Inc., New York, N. Y.
 Scovill Mfg. Co., Waterbury, Conn.
 Seymour Products Co., The, Seymour, Conn.
 Smith, S. K. Co., The, Chicago, Ill.

BOXES, MOLDED PLASTIC

See Molders, Plastic

BOXES, MOLDED PULP

See Containers, Molded Pulp

BOXES, PAPER SET-UP

Acme Paper Box Co., Chicago, Ill.
 Alder, H. M. & Co., Baltimore, Md.
 Alderman Paper Box Corp., Rochester, N. Y.
 American Tri-State Paper Box Co., Nashville, Tenn.
 Angelus Paper Box Corp., Los Angeles, Calif.
 Apex Paper Box Corp., Chicago, Ill.
 Atlantic Carton Corp., Norwich, Conn.
 Atlantic Paper Box Corp., The, Jersey City, N. J.
 Atlas-Boxmakers, Inc., Chicago, Ill.
 Atlas Paper Box Co., Chattanooga, Tenn.
 Babcock, A. H. Co., The, Attleboro, Mass.
 Baldwin, Eli & Son, Inc., New York, N. Y.
 Bangor Box Co., Bangor, Me.
 Barger Box Co., Inc., Elkhart, Ind.
 Beggs & Graham, Phila., Pa.
 Bicknell & Fuller Paper Box Co., Boston, Mass.
 Bierdeman Paper Box Co., The, Chicago, Ill.
 Bird & Son, Inc., East Walpole, Mass.
 Bisler, G. A. Inc., Phila., Pa.
 Bloomer Bros. Co., Newark, New York State
 Brick & Ballerstein, New York, N. Y.
 Bridgeport Paper Box Co., Bridgeport, Conn.
Brooks & Porter, Inc., New York, N. Y.
 Buedingen, Ferdinand Co., Inc., Rochester, N. Y.
 Buffington, F. H. Co., Providence, R. I.
Burt, F. N. Co., Inc., Buffalo, N. Y.
Cambridge Paper Box Co., Cambridge, Mass.
 Capitol Paper Box Co., Inc., No. Bergen, N. J.
 Carter, Wm. Co., Needham Heights, Mass.
 Casco Paper Box Co., Inc., Portland, Me.
 Casselman, T. & E. Inc., New York, N. Y.
 Central States Paper & Bag Co., St. Louis, Mo.
 Claff, M. B. & Sons, Inc., Randolph, Mass.
 Clark, B. Co., The, Danbury, Conn.
 Clover Paper & Transparent Boxes, New York, N. Y.
 Columbus Paper Box Co., Inc., Columbus, Ohio
 Compressed Paper Box Corp., Bridgeport, Conn.
 Consolidated Box Co., Inc., Tampa, Fla.
 Consolidated Paper Box Co., Somerville, Mass.
 Crompton-Adelphia, John Corp., Phila., Pa.
 Crook Paper Box Co., No. Kansas City, Mo.

Cutler & Saleeby, Inc., Springfield, Mass.
 Danbury Square Box Co., The, Danbury, Conn.
 Datz Mfg. Co., Phila., Pa.
 Deisroth, W. H. Co., Inc., Phila., Pa.
 Delman Paper Box Co., The, Cincinnati, Ohio
 Delta Paper Boxes, Inc., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
 Dickerman Box Co., Cambridge, Mass.
 Dix, J. J. Inc., New York, N. Y.
 Dodge Paper Box Co., Leominster, Mass.
 Dorfman, A. Co., Inc., New York, N. Y.
 Eagle Paper Box Co., Detroit, Mich.
 Eagle Paper Box Co., New York, N. Y.
 Eagle Paper Box Mfg. Co., Chicago, Ill.
 Earlville Paper Box Co., Earlville, N. Y.
 Eggers O'Flynn Co., Omaha, Nebr.
 Ellis, Geo. D. & Sons, Inc., Phila., Pa.
 Eureka Paper Box Corp., Chicago, Ill.
 Fairchild, E. E. Corp., Rochester, N. Y.
 Fibreboard Products, Inc., San Francisco, Calif.
 Fleishacker Paper Box Co., San Francisco, Calif.
 Fleisig, H. Inc., New York, N. Y.
 Flour City Paper Box Co., Minneapolis, Minn.
 Flower City Specialty Co., Rochester, N. Y.
 Foster & Cross, Inc., Bklyn, N. Y.
 Frankenberg Bros., Inc., Columbus, Ohio
 Friend Box Co., Danvers, Mass.
 Futuristic Paper Box Co. Inc. Bklyn, N. Y.
 Garfield Box Co., Clifton, N. J.
 Gerbereux, Dufft & Kinder, New York, N. Y.
 Globe Paper Box Mfg. Co., St. Paul, Minn.
 Grand Rapids Paper Box Co., Grand Rapids, Mich.
 Great Lakes Box Co., The, Cleveland, Ohio
 Green Bros., Inc., E. Providence, R. I.
 Greenfield Paper Box Co., Greenfield, Mass.
 Hashagen Paper Box Co., Washington, D. C.
 Hess & Densen, New York, N. Y.
 Henry, Ira L. Co., Watertown, Wis.
 Heywood Mfg. Co., Minneapolis, Minn.
 Hickory Paper Box Co., Hickory, N. C.
 High Point Paper Box Co., Inc., High Point, N. C.
 Hoague-Sprague Corp., Lynn, Mass.
 Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
 Hope Paper Box Co., Providence, R. I.
 Howell, F. M. & Co., Elmira, N. Y.
 Illinois Paper Box Co., Chicago, Ill.
 Imperial Paper Box Co., Bklyn, N. Y.
 Indianapolis Paper Container Co., Indianapolis, Ind.
 Jones, Jesse Paper Box Co., Phila., Pa.
 Kalamazoo Paper Box Co., Kalamazoo, Mich.
 Kentucky Paper Box Co., Louisville, Ky.
 Keystone Box Co., Pittsburgh, Pa.
 Kiernan-Hughes Co., Jersey City, N. J.
 Klein, A. & Co., Inc., New York, N. Y.
 Koehl, Wm. Co., The, Cincinnati, Ohio
 Kroeck Paper Box Co., Chicago, Ill.
 L-A Paper Box Factory, Los Angeles, Calif.
Lebanon Paper Box Co., Lebanon, Pa.
 Lengsfeld Bros., Inc., New Orleans, La.
 Leominster Paper Box Co., Leominster, Mass.
 Lorscheider-Schang Co., Rochester, N. Y.
 Maderite Paper Box Co., Winsted, Conn.
 Makowsky, J. Corp., New York, N. Y.
 Maryland Paper Box Co., Baltimore, Md.
Mason Box Co., The, Attleboro Falls, Mass.
Master Craftsmen of the Set-Up Paper Box Industry, Phila., Pa.
 McClintock Corp., The, Harrisburg, Pa.
 Meyer, Frank C. Co., Inc., Bklyn, N. Y.
 Miller, Walter P. Co., Inc., Phila., Pa.
 Milprint, Inc., Milwaukee, Wis.
 Minkoff & Rosenfield Bros., Inc., Bklyn, N. Y.
 Molitor Box Co., Milwaukee, Wis.
 Mooney & Mooney, Inc., Newark, N. J.

Moser Paper Box Co., St. Louis, Mo.
 National Metal Edge Box Co., Phila., Pa.
 National Paper Box Co., Kansas City, Mo.
 Neumann, Robert Co., Cincinnati, Ohio
 Newark Paper Box Co., Newark, N. J.
 Newton Carton, Newark, N. J.
 North State Paper Box Co., Statesville, N. C.
 Old Dominion Box Co., Charlotte, N. C.
 Old Dominion Box Co., Inc., Lynchburg, Va.
 Paper Package Co., Indianapolis, Ind.
 Perfumers & Jewelers Box Co., New York, N. Y.
 Pharmacy Paper Box Co., Chicago, Ill.
 Pictorial Paper Package Corp., Aurora, Ill.
 Plumly, Eugene K. Co., Phila., Pa.
 Pohl Bros., Richmond, Va.
 Pollock Paper & Box Co., Dallas, Tex.
 Quality Park Box Co., St. Paul, Minn.
 Quincy Paper Box Co., Quincy, Ill.
 Randolph Paper Box Co., Richmond, Va.
Ritchie, W. C. & Co., Chicago, Ill.
 Rock City Paper Box Co., Inc., Nashville, Tenn.
 Rogers, Edward H. Inc., New York, N. Y.
 Rossotti Lithographing Co. Inc. North Bergen N. J.
Rowell, E. N. Co., Inc., Batavia, N. Y.
 Rubin, Jos. & Sons, Inc., Bklyn, N. Y.
 Rudnick, A. & A. Inc., New York, N. Y.
 Scandore Paper Box Co., Bklyn, N. Y.
 Schleicher, F. J. Paper Box Co., St. Louis, Mo.
 Schmeer's Paper Box Co., Inc., Syracuse, N. Y.
 Schmidt, Henry & Bro., Inc., Phila., Pa.
 Schoettle, Edwin J. Co., Phila., Pa.
 Schulz, A. Geo. Co., Milwaukee, Wis.
 Schunak, C. E. Inc., Meriden, Conn.
 Schurmann, F. A. Inc., Bklyn, N. Y.
 Scott & McDonald, Inc., Everett, Mass.
 Seaman Box Co., Inc., New York, N. Y.
 Sears, Merle Paper Box Co., Danville, Ill.
 Seeley Tube & Box Co., Newark, N. J.
 Service Paper Box Co., St. Louis, Mo.
 Shampaign, Citron, Clark, Inc., Bklyn, N. Y.
 Shaw Paper Box Co., Meriden, Conn.
 Shaw Paper Box Co., Pawtucket, R. I.
 Shawprint, Inc., Lowell, Mass.
 Shomer-Majestic Box Corp., New York, N. Y.
Shoup-Owens, Inc., Hoboken, N. J.
Simplex Paper Box Corp., Lancaster, Pa.
 Slichter Box Co., Inc., Monnton, Pa.
 Smith-Lustig Paper Box Mfg. Co., The, Cleveland, Ohio
 Snyder, Geo. H. Inc., Phila., Pa.
 Specialty Paper Box Co., Bklyn, N. Y.
 Stein, A. & Co., Chicago, Ill.
 Sterling-Wasser Box Co., Homestead, Pa.
 Strouse, Adler Co., The, New Haven, Conn.
 Taylor Box Co., Providence, R. I.
 Terre Paper Box Co., Chicago, Ill.
 Thoma Paper Box Co., Inc., Buffalo, N. Y.
 Trilsch, Oscar Co., Whitestone, N. Y.
 Trum, E. J. Inc., Bklyn, N. Y.
 Union Paper Box Mfg. Co., No. Seattle, Wash.
 United Paper Box Co., Chicago, Ill.
 Universal-Engel Paper Box Mfg. Co., Inc., St. Louis, Mo.
 Utica Box Co., Inc., Utica, N. Y.
 Van Ness Bros., Inc., Paterson, N. J.
Voss Karl Corp., Hoboken, N. J.
 Wallace Paper Box Corp., New York, N. Y.
Warner Bros. Co., Bridgeport, Conn.
Waterbury Paper Box Co., Waterbury, Conn.
 Whitney & Co., Leominster, Mass.
 Wilkens Paper Box Co., Inc., Boston, Mass.
 Wilson Paper Box Co., Richmond, Va.
 Wolfsheim & Sachs Co., New York, N. Y.
 Young, Douglas Inc., Pawtucket, R. I.
 Young, Everett F. Co., Providence, R. I.
 Youse, C. J. Co., The, Baltimore, Md.
 Zumbiel, C. W. Co., The, Norwood, Ohio

BOXES, RIGID TRANSPARENT

Acme Paper Box Co., Chicago, Ill.
 Allvue Container Corp., Bklyn, N. Y.
Arrow Mfg. Co., Inc., Hoboken, N. J.
 Athol Paper Box Co., Athol, Mass.
 Atlanta Box Factory, Atlanta, Ga.
 Atlantic Paper Box Co., Boston, Mass.
 Autokraft Box Co., Hanover, Pa.
 Babcock Box Co., Attleboro, Mass.
 Barger Box Co., Inc., Elkhart, Ind.
 Beggs & Graham, Phila., Pa.
 Benton Harbor Mfg. Co., Benton Harbor, Mich.
 Bisler, G. A. Inc., Phila., Pa.
 Box Novelties, Inc., New York, N. Y.
 Box Shop, Inc., New Haven, Conn.
 Buckley, C. E. Co., Leominster, Mass.
 Buedingen, Wm. & Son, Rochester, N. Y.
Burt, F. N. Co., Inc., Buffalo, N. Y.
Cambridge Paper Box Co., Cambridge, Mass.
 Casco Paper Box Co., Inc., Portland, Me.
 Celanese Celluloid Corp., New York, N. Y.
 Central States Paper & Bag Co., Inc., St. Louis, Mo.
Clark, Geo. V. Co., Inc., Long Island City, N. Y.
Cleveland Container Corp., Cleveland, Ohio
 Clover Paper & Transparent Boxes, Inc., New York, N. Y.
 Courmand, E. L. Inc., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
 Design Center, Inc., New York, N. Y.
 Dickerman Box Co., Cambridge, Mass.
 Dorfman, A. & Co., Inc., New York, N. Y.
 Earlville Paper Box Co., Earlville, N. Y.
 Eggers O'Flyng Co., Omaha, Nebr.
 Enbee Transparent Specialty Co., New York, N. Y.
 Everett Transparent Container Co., New York, N. Y.
 Fairchild, E. E. Corp., Rochester, N. Y.
 Fleishhacker Paper Box Co., San Francisco, Calif.
 Fleisig, H. Inc., New York, N. Y.
 Flower City Specialty Co., Rochester, N. Y.
 Friend Box Co., Danvers, Mass.
 Frost Box Co., Inc., Pawtucket, R. I.
 Globe Paper Box Co., Chicago, Ill.
 Globe Paper Box Mfg. Co., St. Paul, Minn.
 Hampshire Paper Box Co., Florence, Mass.
 Harvard Specialty Mfg. Corp., Cambridge, Mass.
 Henry, Ira L. Co., Watertown, Wis.
 High Point Paper Box Co., High Point, N. C.
 Howell, F. M. & Co., Elmira, N. Y.
 Hygienol Co., New York, N. Y.
 J. L. Paper Box Co., Attleboro, Mass.
 Landowne, J. Co., The, Bklyn, N. Y.
Lebanon Paper Box Co., Lebanon, Pa.
 Leominster Paper Box Co., Leominster, Mass.
 Lorscheider-Schang Co., Rochester, N. Y.
Mason Box Co., Attleboro Falls, Mass.
 Meier, Joshua, New York, N. Y.
 Merrick Transparent Products, Long Island City, N. Y.
 Meyer, Frank C. Co., Bklyn, N. Y.
 Mever, Jos. H. Bros., Bklyn, N. Y.
Miller, Walter P. Co., Inc., Phila., Pa.
 National Transparent Box Co., Springfield, Mass.
 Old Dominion Box Co., Inc., Charlotte, N. C.
 Parfait Powder Puff Co., Chicago, Ill.
 Paper Package Co., Indianapolis, Ind.
 Pedersen Mfg. Co., Los Angeles, Calif.
 Plumly, Geo. W. Co., Phila., Pa.
 Price, M. B. Associates, New York, N. Y.
Ritchie, W. C. & Co., Chicago, Ill.
 Robinson, A. E. & Co., Chicago, Ill.
 Rudnick, A. & A. Inc., New York, N. Y.
 Schleicher, F. J. Paper Box Co., St. Louis, Mo.
 Seaman Box Co., Inc., New York, N. Y.
 Shaw Paper Box Co., Meriden, Conn.
Shoup-Owens, Inc., Hoboken, N. J.

Siegel, A. L. Co., Newark, N. J.
 Stecker Paper Box Co., Detroit, Mich.
 Stein, A. & Co., Inc., Chicago, Ill.
 Taylor Box Co., Providence, R. I.
 Transparent Specialties Corp., Cleveland, Ohio
 Union Specialty Co., Plainfield, N. J.
U. S. Envelope Co., Springfield, Mass.
 Walco Plastics, E. Orange, N. J.
 Wallace Paper Box Corp., New York, N. Y.
 Warneke Paper Box Co., Denver, Colo.
Warner Bros. Co., The, Bridgeport, Conn.
Waterbury Paper Box Co., Inc., Waterbury, Conn.
 Weinman Bros., Chicago, Ill.
 Williams Bros., St. Joseph, Mich.
 Young, Douglas Inc., Pawtucket, R. I.
 Zumbiel, C. W. Co., Cincinnati, Ohio

BOXES, TIN LITHOGRAPHED

American Can Co., New York, N. Y.
 Bertels Metal Ware Co., Kingston, Pa.
 Burdick & Son, Albany, N. Y.
Clark, Geo. V. Co., Inc., Long Island City, N. Y.
 Clark, J. L. Mfg. Co., Rockford, Ill.
 Columbia Specialty Co., Inc., Baltimore, Md.
Continental Can Co., New York, N. Y.
Crown Can Co., Phila., Pa.
 Ellis, Geo. D. & Sons, Inc., Phila., Pa.
 Federal Tin Co., Inc., Baltimore, Md.
 Fein's Tin Can Co., Inc., Bklyn, N. Y.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Heekin Can Co., Cincinnati, Ohio
 Hudson, H. L., Co., The, New York, N. Y.
 Independent Can Co., Baltimore, Md.
 Ketcham, Howard Inc., New York, N. Y.
 Liberty Can & Sign Co., Lancaster, Pa.
 Litho Can Corp., Camden, N. J.
 Mason Can Co., Providence, R. I.
 National Can Corp., New York, N. Y.
 Owens-Illinois Can Co., Toledo, Ohio
 Pacific Can Co., San Francisco, Calif.
 Purepac Corp., New York, N. Y.
 Seymour Products Co., The, Seymour, Conn.
 Stuber & Kuck Co., Peoria, Ill.
 Western Can Co., San Francisco, Calif.

BOXES, WINDOW

See Boxes, Paper Set-Up
 See Cartons, Folding & Display

BOXES & BASKETS, VEGETABLE & FRUIT

Ashabula Corrugated Box Co., The, Ashabula, Ohio
 Container Corp. of America, Chicago, Ill.
 Gaylord Container Corp., St. Louis, Mo.
 Hinde & Dauch Paper Co., The, Sandusky, Ohio
 Inland Container Corp., Indianapolis, Ind.
 Ohio Boxboard Co., The, Rittman, Ohio

CADDIES, CRACKERS

Ace Carton Corp., Cicero, Ill.
 American Can Co., New York, N. Y.
 Central States Paper & Bag Co., St. Louis, Mo.
 Consolidated Paper Co., Monroe, Mich.
 Crook Paper Box Co., Kansas City, Mo.
Crown Can Co., Phila., Pa.
 Densen-Banner Co., Ridgefield Park, N. J.
 Empire Box Corp., Garfield, N. J.
 Fibreboard Prods., Inc., San Francisco, Calif.
Gair, Robert Co., Inc., New York, N. Y.
 Gardner-Richardson Co., Middletown, Ohio
 Gaylord Container Corp., St. Louis, Mo.
 Hinde & Dauch Paper Co., The, Sandusky, Ohio

Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.

Inland Container Corp., Indianapolis, Ind.
Interstate Folding Box Co., Middletown, Ohio

Morris Paper Mills, Chicago, Ill.

National Can Corp., New York, N. Y.

Pohlig Bros., Richmond, Va.

Pollock Paper & Box Co., Dallas, Tex.

Schoettle, Edwin J. Co., Phila., Pa.

Schulz, A. Geo. Co., Milwaukee, Wis.

Texas Paper Box Mfg. Co., Dallas, Tex.

Transparent Specialties Corp., Cleveland, Ohio

Waldorf Paper Products Co., St. Paul, Minn.

Wolverine Carton Co., Grand Rapids, Mich.

CAN SEALING COMPOUNDS

Ams, Max Machine Co., The, Bridgeport, Conn.

Dewey & Almy Chemical Co., Cambridge, Mass.

Firestone Rubber & Latex Products Co., Fall River, Mass.

International Printing Ink, Div. Interchemical Corp., New York, N. Y.

Union Carbide & Carbon Corp., New York, N. Y.

CANS, FIBRE

American Can Co., New York, N. Y.

Burt, F. N. Co., Inc., Buffalo, N. Y.

Cambridge Paper Box Co., Cambridge, Mass.

Canister Co., The, Phillipsburg, N. J.

Cin-Made Corp., The, Cincinnati, Ohio

Clark, Geo. V. Co., Inc., Long Island City, N. Y.

Cleveland Container Co., The, Cleveland, Ohio

Consolidated Box Co., Inc., Tampa, Fla.

Continental Can Co., New York, N. Y.

Fibreboard Prods., Inc., San Francisco, Calif.

Gardner-Richardson Co., Middletown, Ohio

Gates Paper Co., Ltd., The, Los Angeles, Calif.

Indianapolis Paper Container Co., Indianapolis, Ind.

Menasha Products Co., The, Menasha, Wis.

National Paper Box Co., Kansas City, Mo.

Pictorial Paper Package Corp., Aurora, Ill.

Platt Corp., Baltimore, Md.

Purepac Corp., New York, N. Y.

Randolph Paper Box Co., Richmond, Va.

R. C. Can Co., St. Louis, Mo.

Ritchie, W. C. & Co., Chicago, Ill.

Sealright Co., Inc., Fulton, N. Y.

Sefton Fibre Can Co., St. Louis, Mo.

Shoup-Owens, Inc., Hoboken, N. J.

Sonoco Prods. Co., Hartsville S. C.

Sutherland Paper Co., Kalamazoo, Mich.

Waldorf Paper Products Co., St. Paul, Minn.

CANS, PAPER

(For Bulk Ice Cream)

Morris Paper Mills, Chicago, Ill.

National Folding Box Co., New Haven, Conn.

Sealright Co., Inc., Fulton, N. Y.

Sutherland Paper Co., Kalamazoo, Mich.

CANS, RIGID TRANSPARENT

Cambridge Paper Box Co., Cambridge, Mass.

Celanese Celluloid Corp., New York, N. Y.

Celluplastic Corp., Newark, N. J.

Central States Paper & Bag Co., St. Louis, Mo.

Cin-Made Corp., The, Cincinnati, Ohio

Clark, Geo. V. Co., Inc., Long Island City, N. Y.

Henry, Ira, L. Co., Watertown, Wis.

Levy, Maurice, New York, N. Y.

Neostyle, Inc., Chicago, Ill.

Ritchie, W. C. & Co., Chicago, Ill.

Seaman Box Co., Inc., New York, N. Y.

Transparent Specialties Corp., Cleveland, Ohio

Weinman Bros., Chicago, Ill.

CANS, TIN

American Can Co., New York, N. Y.

Armstrong Paint & Varnish Works, Chicago, Ill.

Arwood Can Co., Knoxville, Tenn.

Bedford Can Co., Bklyn, N. Y.

Belleville Can Co., Belleville, N. J.

Bertels Metal Ware Co., Inc., Kingston, Pa.

Buckeye Stamping Co., Columbus, Ohio

Burdick & Son, Albany, N. Y.

Bushwick Can Co., Inc., Bklyn, N. Y.

Cadillac Can Co., Mt. Clemens, Mich.

Cans, Inc., Chicago, Ill.

Central Can Co., Inc., Chicago, Ill.

Central Can Co., Inc., Kansas City, Mo.

Chesapeake Can Co., Inc., Crisfield, Md.

Clark, Geo. V. Co., Inc., Long Island City, N. Y.

Clark, J. L. Mfg. Co., Rockford, Ill.

Clarke Can Co., Phila., Pa.

Columbia Specialty Co., Inc., Baltimore, Md.

Conneaut Can Co., Inc., Conneaut, Ohio

Continental Can Co., New York, N. Y.

Cordiano Can Co., Inc., Bklyn, N. Y.

Crown Can Co., Phila., Pa.

Davies Can Co., The, Cleveland, Ohio

Eagle Can Co., Somerville, Mass.

Eastern Can Co., Inc., Bklyn, N. Y.

Ellis, Geo. D. & Sons, Inc., Phila., Pa.

Empire Can Corp., Bklyn, N. Y.

Federal Tin Co., Inc., Baltimore, Md.

Fein's Tin Can Co., Inc., Bklyn, N. Y.

General Can Co., Chicago, Ill.

Grand Sheet Metal Works, Chicago, Ill.

Grimely, Frank J., San Francisco, Calif.

Heekin Can Co., Cincinnati, Ohio

Hudson, H. L. Co., Bklyn, N. Y.

Independent Can Co., Baltimore, Md.

LeComte & Co., Inc., Bklyn, N. Y.

Liberty Can & Sign Co., Lancaster, Pa.

Lincoln Can Mfg. Corp., Bklyn, N. Y.

Litho Can Corp., Camden, N. J.

Manufacturers Can Co., Chicago, Ill.

Mason Can Co., Providence, R. I.

Melvina Can Co., Maspeth, L. I., N. Y.

Milton, Geo. A. Can Co., Inc., Bklyn, N. Y.

National Can Corp., New York, N. Y.

National Tin Can Mfg. Co., New York, N. Y.

New Can Co., Inc., The, Malden, Mass.

Olive Can Co., Chicago, Ill.

Owens-Illinois Can Co., Toledo, Ohio

Pacific Can Co., San Francisco, Calif.

Phelps Can Co., Baltimore, Md.

Philadelphia Can Co., Phila., Pa.

Platt Corp., Baltimore, Md.

Purepac Corp., New York, N. Y.

Robertson Can Co., Springfield, Ohio

Sexton Can Co., Inc., Everett, Mass.

Standard Can Co., Chicago, Ill.

Steel & Tin Prods. Co., Inc., Baltimore, Md.

Stuber & Kuck Co., Peoria, Ill.

Superior Can Co., Inc., Bklyn, N. Y.

Thompson Can Co., Dallas, Tex.

Victor Metal Products Corp., Bklyn, N. Y.

Vulcan Stamping & Mfg. Co., Inc., Bellwood, Ill.

Western Can Co., San Francisco, Calif.

Wisconsin Can Co., Inc., Chicago, Ill.

CANS, TIN

(Cellulose Window)

Clark, Geo. V. Co., Inc., Long Island City, N. Y.

Purepac Corp., New York, N. Y.

CARTONS, CAN & BOTTLE CARRIERS

American Coating Mills, Inc., Elkhart, Ind.

Ashtabula Corrugated Box Co., The, Ashtabula, Ohio

Atlantic Carton Corp., Norwich, Conn.

Badger Merchandising Displays, Inc., Milwaukee, Wis.

Brown & Bailey Co., Phila., Pa.

Chicago Carton Co., Chicago, Ill.

Container Corp. of America, Chicago, Ill.

Continental Folding Paper Box Co., Inc., Ridgefield, N. J.

Empire Box Corp., Garfield, N. J.

Federal Carton Corp., New York, N. Y.

Fibreboard Products, Inc., San Francisco, Calif.

Fort Orange Paper Co., Castleton-on-Hudson, N. Y.

Fort Wayne Corrugated Paper Co., Fort Wayne, Ind.

Gair, Robert Co., Inc., New York, N. Y.

Gardner-Richardson Co., Middletown, Ohio

Grand Rapids Paper Box Co., Grand Rapids, Mich.

Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.

International Folding Paper Box Co., Inc., North Bergen, N. J.

Interstate Folding Box Co., The, Middletown, Ohio

Lengsfeld Bros., Inc., New Orleans, La.

Menasha Products Co., The, Menasha, Wis.

Milprint, Inc., Milwaukee, Wis.

Morris Paper Mills, Chicago, Ill.

National Metal Edge Box Co., Phila., Pa.

Nelson, B. F. Mfg. Co., Minneapolis, Minn.

Ohio Boxboard Co., The, Rittman, Ohio

Owens-Illinois Glass Co., Toledo, Ohio

Paper Package Co., Indianapolis, Ind.

Pohlig Bros., Richmond, Va.

Pollock Paper & Box Co., Dallas, Tex.

Reynolds Metals Co., Richmond, Va.

Richardson Taylor-Globe Corp., Cincinnati, Ohio

Robertson Paper Box Co., Inc., Montville, Conn.

Rosotti Lithographing Co., Inc., North Bergen, N. J.

Sample-Durick Co., Inc., Indian Orchard, Mass.

Warner Bros. Co., Bridgeport, Conn.

Wolverine Carton Co., Grand Rapids, Mich.

CARTONS, FOLDING & DISPLAY

Ace Carton Corp., Cicero, Ill.

Acme Folding Box Co., St. Louis, Mo.

Acme Paper Box Co., Chicago, Ill.

Addison Lithographing Co., Rochester, N. Y.

Albert Paper Box Co., Inc., Bklyn, N. Y.

American Box Board Co., Grand Rapids, Mich.

American Coating Mills, Inc., Elkhart, Ind.

American Folding Box Co., St. Louis, Mo.

American Tri-State Paper Box Co., Nashville, Tenn.

Andrews, P. L. Corp., Bklyn, N. Y.

Angelus Paper Box Co., Los Angeles, Calif.

Atlanta Paper Co., Atlanta, Ga.

Atlantic Carton Corp., Norwich, Conn.

Automatic Paper Box Corp., Chicago, Ill.

Badger Carton Co., Milwaukee, Wis.

Bicknell & Fuller Paper Box Co., Boston, Mass.

Bloomer Bros. Co., Newark, New York State

Blum Folding Paper Box Co., Inc., The, Bklyn, N. Y.

Bridgeport Paper Box Co., Bridgeport, Conn.

Brooks & Porter, Inc., New York, N. Y.

Brooks Bank Note Co., Springfield, Mass.

Brown & Bailey Co., Phila., Pa.

- Burt, F. N. Co., Inc., Buffalo, N. Y.**
 Campbell Box & Tag Co., South Bend, Ind.
 Central Carton Co., Cincinnati, Ohio
 Central Paper Box Co., Kansas City, Mo.
 Chicago Carton Co., Chicago, Ill.
 Chicago Label & Box Co., Chicago, Ill.
 Cleveland Cartons Div. of Robert Gair Co., Inc., Cleveland, Ohio
 Columbus Paper Box Co., Inc., Columbus, Ohio
 Consolidated Paper Co., Monroe, Mich.
 Consolidated Paper & Box Mfg. Co., Richmond, Va.
 Container Corp. of America, Chicago, Ill.
 Continental Folding Paper Box Co., Inc., Ridgefield, N. J.
 Continental Paper Prods. Co., Denver, Colo.
 Crescent Box Corp., Phila., Pa.
Dennison Mfg. Co., Framingham, Mass.
 Densen-Banner Co., Ridgefield Park, N. J.
 Diamond Paper Box Co., Rochester, N. Y.
 Disbrow Mfg. Co., Newark, N. J.
 Dowd, M. S. Carton Co., Hartford, Conn.
 Eastern States Cartons Div. of Robert Gair Co., Inc., Bklyn, N. Y.
 Eggers O'Flynn Co., Omaha, Nebr.
 Empire Box Corp., Chicago, Ill.
 Empire Box Corp., Garfield, N. J.
 Eureka Paper Box Co., Williamsport, Pa.
 Fairchild, E. E. Corp., Rochester, N. Y.
 Federal Carton Corp., New York, N. Y.
 Fibreboard Prods., Inc., San Francisco, Calif.
 Fitzhugh, Wm. W. Inc., Bklyn, N. Y.
 Fleishacker Paper Box Co., San Francisco, Calif.
 Fleming & Sons, Inc., Dallas, Tex.
 Flour City Paper Box Co., Minneapolis, Minn.
 Folding Boxes, Inc., Manchester, Conn.
Forbes Lithograph Co., The, Boston, Mass.
Fort Orange Paper Co., Castleton-on-Hudson, N. Y.
 Fox, C. J. Co., The, Providence, R. I.
 Frankenberg Bros., Inc., Columbus, Ohio
 Franklin Folding Paper Box Co., Chicago, Ill.
Gair, Robert Co., Inc., New York, N. Y.
 Gardner-Richardson Co., Middletown, Ohio
 Gaylord Container Corp., St. Louis, Mo.
 Gebhart Folding Box Co., Dayton, Ohio
 Gereke-Allen Carton Co., St. Louis, Mo.
 Globe Paper Box Mfg. Co., St. Paul, Minn.
 Grace, Tom W. Co., Dallas, Tex.
 Grand-City Container Corp., New York, N. Y.
 Grand Rapids Paper Box Co., Grand Rapids, Mich.
 Grant Paper Box Co., Pittsburgh, Pa.
 Great Lakes Box Co., Cleveland, Ohio
 Guilford Folding Box Co., The, Baltimore, Md.
 Hashagen Paper Box Co., Washington, D. C.
 High Point Paper Box Co., Inc., High Point, N. C.
 Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
 Howell, F. M. & Co., Elmira, N. Y.
 Hummel & Downing Co., Milwaukee, Wis.
 Ideal Carton Co., Chicago, Ill.
 Imperial Box Co., Chicago, Ill.
 Indianapolis Paper Container Co., Indianapolis, Ind.
 International Folding Paper Box Co., Inc., North Bergen, N. J.
 Interstate Folding Box Co., The, Middletown, Ohio
Lebanon Paper Box Co., Lebanon, Pa.
 Lengsfeld Bros., Inc., New Orleans, La.
 Lindley Box & Paper Co., Marion, Ind.
 Lowman Folding Box Corp., Syracuse, N. Y.
 Maryland Paper Box Co., Baltimore, Md.
 Menasha Prod. Co., The, Menasha, Wis.
 Michigan Carton Co., Battle Creek, Mich.
 Milprint, Inc., Milwaukee, Wis.
Morris Paper Mills, Chicago, Ill.
 Mott Carton & Paper Co., St. Louis, Mo.
 Muskegon Paper Box Co., Muskegon, Mich.
- Myers, J. & P. B. Inc., Jersey City, N. J.**
National Folding Box Co., New Haven, Conn.
 National Metal Edge Box Co., Phila., Pa.
 National Paper Co., Atlanta, Ga.
 National Paper Box Co., Kansas City, Mo.
 National Paper Box Mfg. Co., Chicago, Ill.
 Nelson, B. F. Mfg. Co., Minneapolis, Minn.
 Neumann, Robert Co., Cincinnati, Ohio
 Nevins-Church Press, The, New York, N. Y.
 New Haven Pulp & Board Co., New Haven, Conn.
Ohio Boxboard Co., The, Rittman, Ohio
 Old Dominion Box Co., Charlotte, N. C.
 Paper Box & Specialty Co., Sheboygan, Wis.
 Paper Package Co., Indianapolis, Ind.
 Pictorial Paper Package Corp., Aurora, Ill.
 Pie-Pak Co., Inc., Hoboken, N. J.
 Pioneer Paper Box Co., Minneapolis, Minn.
 Pohlig Bros., Richmond, Va.
 Pollock Paper & Box Co., Dallas, Tex.
 Randolph Box & Label Co., Chicago, Ill.
 Randolph Paper Box Co., Richmond, Va.
 Reynolds Metals Co., Richmond, Va.
Richardson Taylor-Globe Corp., Cincinnati, Ohio
 Robertson Paper Box Co., Inc., Montville, Conn.
 Rochester Folding Box Co., Rochester, N. Y.
 Rock City Paper Box Co., Nashville, Tenn.
 Rosotti Lithographing Co., Inc., North Bergen, N. J.
 Royal Paper Box Co., Los Angeles, Calif.
 Sample-Durick Co., Indian Orchard, Mass.
 Scandore Paper Box Co., Inc., Bklyn, N. Y.
 Schmidt, Henry & Bro., Inc., Phila., Pa.
 Schmidt Lithograph Co., San Francisco, Calif.
 Schoettle, Edwin J. Co., Phila., Pa.
 Schultz Folding Box Co., St. Louis, Mo.
 Schulz, A. Geo. Co., Milwaukee, Wis.
 Seaman Box Co., Inc., New York, N. Y.
 Sears, Merle Paper Box Co., Danville, Ill.
 Self-Locking Carton Co., Chicago, Ill.
Shellmar Products Co., Mt. Vernon, Ohio
 Shultz Folding Box Co., St. Louis, Mo.
 Shuttleworth Carton Co., Inc., New York, N. Y.
Simplex Paper Box Corp., Lancaster, Pa.
 Southern Paper Co., Ltd., New Orleans, La.
 Standard Paper Box Co., Detroit, Mich.
 Standard Paper Box Corp., Los Angeles, Calif.
 Stecher-Traung Lithograph Corp., Rochester, N. Y.
 Superior Folding Box Co., St. Louis, Mo.
Sutherland Paper Co., Kalamazoo, Mich.
 Texas Paper Box Mfg. Co., Dallas, Tex.
 Toledo Paper Box Co., Toledo, Ohio
 Trenton Folding Box Co., Trenton, N. J.
 Trum, E. J. Inc., Bklyn, N. Y.
 Union Paper Box Co., Seattle, Wash.
 United Paperboard Co., New York, N. Y.
United States Printing & Lithograph Co., Cincinnati, Ohio
 Waldorf Paper Products Co., St. Paul, Minn.
 Warneke Paper Box Co., Denver, Colo.
Warner Bros. Co., The, Bridgeport, Conn.
 Western Paper Box Co., Oakland, Calif.
 Whitney & Co., Leominster, Mass.
 Wilkata Folding Box Co., Kearny, N. J.
 Wilson Paper Box Co., Inc., Richmond, Va.
 Wolverine Carton Co., Grand Rapids, Mich.
 Zumbiel, C. W. Co., Cincinnati, Ohio
- Chicago Carton Co., Chicago, Ill.
 Consolidated Paper Co., Monroe, Mich.
 Container Corp. of America, Chicago, Ill.
 Densen-Banner Co., Ridgefield Park, N. J.
 Empire Box Corp., Garfield, N. J.
 Federal Carton Corp., New York, N. Y.
 Fibreboard Prods., Inc., San Francisco, Calif.
Fort Orange Paper Co., Castleton-on-Hudson, N. Y.
 Fox, C. J. Co., The, Providence, R. I.
 Frankenberg Bros., Inc., Columbus, Ohio
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
 Gates Paper Co., Ltd., The, Los Angeles, Calif.
Gaylord Container Corp., St. Louis, Mo.
 Globe Paper Box Mfg. Co., St. Paul, Minn.
 Grant Paper Box Co., Pittsburgh, Pa.
 High Point Paper Box Co., Inc., High Point, N. C.
 Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
 Interstate Folding Box Co., Middletown, Ohio
 Lindley Box & Paper Co., Marion, Ind.
 Menasha Products Co., The, Menasha, Wis.
Michigan Carton Co., Battle Creek, Mich.
Morris Paper Mills, Chicago, Ill.
 National Paper Box Co., Kansas City, Mo.
 Nelson, B. F. Mfg. Co., Minneapolis, Minn.
Ohio Boxboard Co., The, Rittman, Ohio
 Old Dominion Box Co., Charlotte, N. C.
 Paper Package Co., Indianapolis, Ind.
 Pohlig Bros., Richmond, Va.
 Pollock Paper & Box Co., Dallas, Tex.
Richardson Taylor-Globe Corp., Cincinnati, Ohio
 Robertson Paper Box Co., Montville, Conn.
 Schmidt Lithograph Co., San Francisco, Calif.
 Schoettle, Edwin J. Co., Phila., Pa.
 Schulz, A. Geo. Co., Milwaukee, Wis.
 Shuttleworth Carton Co., Inc., New York, N. Y.
Sutherland Paper Co., Kalamazoo, Mich.
 United Paperboard Co., New York, N. Y.
 Waldorf Paper Products Co., St. Paul, Minn.
Warner Bros. Co., The, Bridgeport, Conn.
 Wolverine Carton Co., Grand Rapids, Mich.
 Zumbiel, C. W. Co., Cincinnati, Ohio

CAST RESIN PLASTICS

See Plastic Materials (Cast Phenol)

CELLOPHANE

du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
 Sylvania Industrial Corp., New York, N. Y.

CHARMS

(Stringing)

Eppy, Samuel Inc., New York, N. Y.

CHIPBOARD

See Box Board, Folding & Set-Up

CLOSURE LINERS

Aluminum Co. of America, Pittsburgh, Pa.
Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork Co., Lancaster, Pa.
 Bernardin Bottle Cap Co., Inc., Evansville, Ind.
 Bond Mfg. Corp., Inc., Wilmington, Del.

Columbia Specialty Co., Inc., Baltimore, Md.
Dewey & Almy Chemical Co., Cambridge B, Mass.
 Dobeckmun Co., The, Cleveland, Ohio
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
 Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.
 Pollock Paper & Box Co., Dallas, Tex.
Traver Corp., Chicago, Ill.
 Union Carbide & Carbon Corp., New York, N. Y.

CLOSURE SEALING COMPOUNDS

Dewey & Almy Chemical Co., Cambridge B, Mass.
 Dispersions Process, Inc., New York, N. Y.
 International Printing Ink, Div. Interchemical Corp., New York, N. Y.
 Naugatuck Chemical Div. of U. S. Rubber Co., New York, N. Y.
 Pyroxylin Products, Inc., Chicago, Ill.

CLOSURES, APPLICATOR

(Glass, Rod, Brush, Dropper, Swab)

Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork Co., Lancaster, Pa.
Brockway Glass Co., Inc., Brockway, Pa.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
 Consolidated Fruit Jar Co., New Brunswick, N. J.
 Double Duty Products, Inc., Cleveland, Ohio
 Glass Industries, Inc., New York, N. Y.
 Grigoleit Co., The, Decatur, Ill.
Kimble Glass Co., Vineland, N. J.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Super-Seal Container Corp., Washington, D. C.
Terkelsen Machine Co., Boston, Mass.
Wirz, A. H. Inc., Chester, Pa.

CLOSURES, BAG

(Thermo-Plastic)

Betner, Benj. C. Co., Devon, Pa.
 Interstate Folding Box Co., Middletown, Ohio
Royal, Thomas M. & Co., Phila., Pa.

CLOSURES, CORK

See Corks

CLOSURES, CROWN

Armstrong Cork Co., Lancaster, Pa.
 Bernardin Bottle Cap Co., Inc., Evansville, Ind.
 Bond Mfg. Corp., Inc., Wilmington, Del.
 Continental Can Co., New York, N. Y.
Crown Cork & Seal Co., The, Baltimore, Md.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
Mundet Cork Corp. (Closure Division), Bklyn, N. Y.

CLOSURES, GLASS

Aluminum Container Corp., Fulton, N. Y.
Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork Co., Lancaster, Pa.
 Bernardin Bottle Cap Co., Inc., Evansville, Ind.

Bond Mfg. Corp., Inc., Wilmington, Del.
 Braun, W. Co., Chicago, Ill.
Brockway Glass Co., Inc., Brockway, Pa.
 Carr-Lowrey Glass Co., Baltimore, Md.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Kimble Glass Co., Vineland, N. J.
 Phoenix Metal Cap Co., Chicago, Ill.
Owens-Illinois Glass Co., Toledo, Ohio
 Super-Seal Container Corp., Washington, D. C.
 Swindell Bros., Baltimore, Md.

CLOSURES, METAL

Advanced Closures Corp., Bklyn, N. Y.
 Ajax Bottle Cap Corp., Bklyn, N. Y.
 Aluminum Company of America, Pittsburgh, Pa.
 Aluminum Container Corp., Fulton, N. Y.
 Aluminum Goods Mfg. Co., Manitowoc, Wis.
 Aluminum Seal Co., New Kensington, Pa.
Anchor Hocking Glass Corp., Lancaster, Ohio
Aridor Company, Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
 Bernardin Bottle Cap Co., Inc., Evansville, Ind.
 Bond Mfg. Corp., Inc., Wilmington, Del.
 Brass Goods Mfg. Corp., Bklyn, N. Y.
 Braun, W. Co., Chicago, Ill.
 Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.
 Carvin Bottle Cap Corp., Bklyn, N. Y.
 Clark, J. L. Mfg. Co., Rockford, Ill.
 Columbia Specialty Co., Inc., Baltimore, Md.
Crown Cork & Seal Co., The, Baltimore, Md.
 Eastern Cap & Closure Corp., Baltimore, Md.
 Ellis, George D. & Sons, Inc., Phila., Pa.
 Empire Metal Cap Co., Inc., Bklyn, N. Y.
 Fabart Instrument Co., Chicago, Ill.
 Federal Tool Corp., Chicago, Ill.
 General Can Co., Chicago, Ill.
 Guardian Safety Seal Co., Chicago, Ill.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
Hazel-Atlas Glass Co., Wheeling, W. Va.
 Henlopen Mfg. Co., Lewes, Del.
 Keystone Cap Co., Columbia, Pa.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.
 National Can Corp., New York, N. Y.
 National Seal Corp., Bklyn, N. Y.
Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Cal.
 Phoenix Metal Cap Co., Chicago, Ill.
 Prescott, J. L. Co., Passaic, N. J.
 Scovill Mfg. Co., Waterbury, Conn.
 Sterling Seal Co., Erie, Pa.
 Swan Metal Cap Co., Inc., Chicago, Ill.
 Trio Metal Cap Co., Chicago, Ill.
 Uppressit Products Corp., New York, N. Y.
 Western Stopper Co., Inc., San Francisco, Calif.
 West Penn Mfg. & Supply Corp., Brackenridge, Pa.
 White Cap Co., Chicago, Ill.
 Williams Sealing Corp., Decatur, Ill.
Wirz, A. H. Inc., Chester, Pa.

CLOSURES, METAL

(Tamper-Proof)

Aluminum Seal Co., New Kensington, Pa.
Anchor Hocking Glass Corp., Lancaster, Ohio
Aridor Co., The, Chicago, Ill.
 Canister Co., The, Phillipsburg, N. J.
Crown Can Co., Phila., Pa.
 Guardian Safety Seal Co., Chicago, Ill.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
 Na-Mac Products Corp., Hollywood, Calif.
 National Seal Corp., Bklyn, N. Y.
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Phoenix Metal Can Co., Chicago, Ill.
 Williams Sealing Corp., Decatur, Ill.

CLOSURES, MOLDED PLASTIC

American Molding Co., San Francisco, Calif.
Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Auburn Button Works, Inc., Auburn, N. Y.
Boonton Molding Co., Boonton, N. J.
 Braun, W. Co., Chicago, Ill.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
 Davies, Harry Molding Co., Chicago, Ill.
 Dodge Cork Co., Lancaster, Pa.
 Federal Tool Corp., Chicago, Ill.
 General Electric Co., Plastics Dept., Pittsfield, Mass.
 Grigoleit Co., The, Decatur, Ill.
 Kurz-Kasch, Inc., Dayton, Ohio
Mack Molding Co., Wayne, N. J.
 Michigan Molded Plastics, Inc., Dexter, Mich.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.
 Northern Industrial Chem. Co., South Boston, Mass.
Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Phoenix Metal Cap Co., Chicago, Ill.
 Plastic & Die Cast Prod. Corp., Los Angeles, Calif.
 Plastics, Inc., Bradley Beach, N. J.
 Standard Molding Co., Baltimore, Md.
Terkelsen Machine Co., Boston, Mass.
Victor Metal Products Corp., Bklyn, N. Y.
 Waterbury Button Co., The, Waterbury, Conn.
 Watertown Mfg. Co., Watertown, Conn.
 Wheeling Stamping Co., Wheeling, W. Va.
 Williams Sealing Corp., Decatur, Ill.

CLOSURES, PAPER

American Seal-Kap Co., Long Island City, N. Y.
Burt, F. N. Co., Inc., Buffalo, N. Y.
 Guardian Safety Seal Co., Chicago, Ill.
 National Seal Corp., Bklyn, N. Y.
 Niemand Bros., Inc., Long Island City, N. Y.
Owens-Illinois Glass Co., Toledo, Ohio
Sealright Co., Inc., Fulton, N. Y.
Waterbury Paper Box Co., The, Waterbury, Conn.

CLOSURES, SECONDARY

(Foil)

Aluminum Seal Co., New Kensington, Pa.
 Reynolds Metals Co., Richmond, Va.

(Viscose)

Armstrong Cork Co., Lancaster, Pa.
 Celon Co., The, Madison, Wis.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
 Sylvania Industrial Corp., New York, N. Y.

CLOSURES, FOR VACUUM SEALING

Aluminum Seal Co., New Kensington, Pa.
Anchor Hocking Glass Corp., Lancaster, Ohio
Aridor Co., The, Chicago, Ill.
 Bernardin Bottle Cap Co., Inc., Evansville, Ind.
Crown Cork & Seal Co., The, Baltimore, Md.
Dewey & Almy Chemical Co., Cambridge B, Mass.
Guardian Safety Seal Co., Chicago, Ill.
 Gutmann, Ferdinand & Co., Bklyn, N. Y.
Hazel-Atlas Glass Co., Wheeling, W. Va.
 National Seal Corp., Bklyn, N. Y.
Owens-Illinois Glass Co., Toledo, Ohio

Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Phoenix Metal Cap Co., Chicago, Ill.
Super-Seal Container Corp., Washington, D. C.
White Cap Co., Chicago, Ill.
Williams Sealing Corp., Decatur, Ill.

CLOSURES, WOOD

Amdeco, New York, N. Y.
Paragon Wood Turning Co., Inc., New York, N. Y.
Schutze Bros., New York, N. Y.

COATINGS, PROTECTIVE

American Printing Ink Co., Div. General Printing Ink Corp., Chicago, Ill.
American Products Mfg. Co., New Orleans, La.
Atlas Powder Co., Zapon-Keratol Div., Stamford, Conn.
Atlas Powder Co., Zapon-Brevolite Div., Chicago, Ill.
Ault & Wiborg Corp., Subsidiary of Interchemical Corp., New York, N. Y.
Bakelite Corp., New York, N. Y.
California Ink Co., Inc., San Francisco, Calif.
Catalin Corp., New York, N. Y.
Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Clover Leaf Paint & Varnish Corp., Long Island City, N. Y.
Corn Products Refining Co., New York, N. Y.
Davison Chemical Corp., The, Baltimore, Md.
Dewey & Almy Chemical Corp., Cambridge B, Mass.
Dispersions Process, Inc., New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Durez Plastics & Chemicals, Inc., No. Tonawanda, N. Y.
Eagle Printing Ink Co., Div. General Printing Ink Corp., New York, N. Y.
Egyptian Lacquer Mfg. Co., The, New York, N. Y.
Fales Chemical Co., Inc., The, Cornwall Landing, N. Y.
Fuch & Lang Mfg. Co., Div. General Printing Ink Corp., New York, N. Y.
General Industrial Finishes, Div. General Printing Ink Corp., New York, N. Y.
General Printing Ink Corp., New York, N. Y.
Goodrich, B. F. Co., The, Akron, Ohio
Gordon-Lacey Chemical Products Co., Maspeth, L. I., N. Y.
Huber, J. M. Inc., New York, N. Y.
International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Interstate Folding Box Co., Middletown, Ohio
Levey, Fred'k H. Co. Inc., New York, N. Y.
Maas & Waldstein Co., Newark, N. J.
McCoy Paper Converters, Phila., Pa.
Morrill, Geo. H. Co., Div. General Printing Ink Corp., New York, N. Y.
National Adhesives Div. of National Starch Products, Inc., New York, N. Y.
Naugetuck Chemical, Div. of U. S. Rubber Co., New York, N. Y.
Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Plastic Coating Corp., Holyoke, Mass.
Plastics Finishing Corp., Bklyn, N. Y.
Pope & Gray, Inc., New York, N. Y.
Protective Coatings, Inc., Detroit, Mich.
Pyrotex Leather Co., Leominster, Mass.
Pyroxilin Products, Inc., Chicago, Ill.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Roberts, Lewis Inc., Newark, N. J.
Roosen, H. D. Ink Co., Bklyn, N. Y.
Seal, Inc., Shelton, Conn.

Ullman, Sigmund Co., Div. General Printing Ink Corp., New York, N. Y.
Union Carbide & Carbon Corp., New York, N. Y.
U. S. Finishing & Mfg. Co., Chicago, Ill.

COMPACTS, PAPER

Burt, F. N. Co., Inc., Buffalo, N. Y.

COMPACTS, PLASTIC

See Molders, Plastic

CONTAINERS, METAL

See Boxes, Metal Specialties

CONTAINERS, MOLDED PULP

Chaspec Mfg. Co., New York, N. Y.
Holed-Tite Packing Corp., Herkimer, N. Y.
Keyes Fibre Co., Waterville, Me.
Pulp Reproduction Co., Milwaukee, Wis.
Read, Robert E. Inc., Dexter, N. Y.
Self-Locking Carton Co., Chicago, Ill.

CONTAINERS, PAPER

(Liquid-Holding)

American Can Co., New York, N. Y.
American Paper Goods Co., Kensington, Conn.
Betner, Benj. C. Co., Devon, Pa.
Cunioles-Hesse Corp., St. Louis, Mo.
Dixie-Vortex Co., Easton, Pa.
Fibreboard Prods., Inc., San Francisco, Calif.
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
Interstate Folding Box Co., The, Middletown, Ohio
Lily Tulip Cup Corp., New York, N. Y.
Mono Service Co., Newark, N. J.
Royal, Thomas M. & Co., Phila., Pa.
Schoettle, Edwin J. Co., Phila., Pa.
Sealright Co., Inc., Fulton, N. Y.
Stecher-Traung Litho. Corp., Rochester, N. Y.
Sutherland Paper Co., Kalamazoo, Mich.
Sweetman, Geo. H. Inc., Cambridge, Mass.

CONTAINERS, PAPER

(Milk)

American Can Co., New York, N. Y.
American Paper Bottle Co., Toledo, Ohio
American Sealcone Corp., New York, N. Y.
Brown & Bailey Co., Phila., Pa.
Ex-Cell-O Corp., Detroit, Mich.
Fibreboard Prods., Inc., San Francisco, Calif.
Gair, Robert Co., Inc., New York, N. Y.
Gardner-Richardson Co., The, Middletown, Ohio
Menasha Products Co., The, Menasha, Wis.
Reed Container Sales Corp., New York, N. Y.
Sealright Co., Inc., Fulton, N. Y.
Single-Service Containers, Inc., New York, N. Y.
Sutherland Paper Co., Kalamazoo, Mich.

CONTAINERS, PAPER

(Nesting)

American Lace Paper Co., Milwaukee, Wis.
American Paper Goods Co., The, Kensington, Conn.
Bloomer Bros. Co., Newark, N. Y.
Container Corp. of America, Chicago, Ill.
Cupples-Hesse Corp., St. Louis, Mo.
Densen-Banner Co., Ridgefield Park, N. J.
Dixie-Vortex Co., Easton, Pa.
Lily Tulip Cup Corp., New York, N. Y.
Menasha Products Co., The, Menasha, Wis.

Mono Service Co., Newark, N. J.
Old Dominion Box Co., Charlotte, N. C.
Randolph Paper Box Co., Richmond, Va.
Schoettle, Edwin J. Co., Phila., Pa.
Schulz, A. Geo. Co., Milwaukee, Wis.
Sealright Co., Inc., Fulton, N. Y.
Sutherland Paper Co., Kalamazoo, Mich.
Warner Bros. Co., The, Bridgeport, Conn.

CONTAINERS, SHIPPING

See Boxes, Corrugated & Solid Fibre

CONTAINERS, SHIPPING WEATHERPROOF FIBRE

American Box Board Co., Grand Rapids, Mich.
Ashtubula Corrugated Box Co., The, Ashtubula, Ohio
Bird & Son, Inc. East Walpole, Mass.
Carpenter Container Corp., Bklyn, N. Y.
Consolidated Paper Co., Monroe, Mich.
Crook Paper Box Co., No. Kansas City, Mo.
Erie Corrugated Box Co., The, Erie, Pa.
Fort Wayne Corrugated Paper Co., Fort Wayne, Ind.
Gair, Robert Co., Inc., New York, N. Y.
Gaylord Container Corp., St. Louis, Mo.
Hinde & Dauch Paper Co., The, Sandusky, Ohio
Inland Container Corp., Indianapolis, Ind.
National Container Corp., Long Island City, N. Y.
Ohio Boxboard Co., The, Rittman, Ohio
Waldorf Paper Products Co., St. Paul, Minn.

CONVEYORS

Alvey-Ferguson Co., The, Cincinnati, Ohio
Chain Belt Co., Milwaukee, Wis.
Colton, Arthur Co., Detroit, Mich.
Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Container Equipment Corp., Newark, N. J.
Crown Cork & Seal Co., The, Baltimore, Md.
Ferguson, J. L. Co., Joliet, Ill.
Gump, B. F. Co., Chicago, Ill.
Horix Manufacturing Co., Pittsburgh, Pa.
Hulbert Engineering Corp., Watertown, Wis.
International Staple & Machine Co., Clifton Heights, Pa.
Jeffrey Mfg. Co., The, Columbus, Ohio
Kiefer, Karl Machine Co., Cincinnati, Ohio
Lamson Corp., Syracuse, N. Y.
Link-Belt Co., Chicago, Ill.
Logan Co., Louisville, Ky.
Mathews Conveyor Co., Ellwood City, Pa.
McGuire, Walter, Bklyn, N. Y.
Mojonnier Bros. Co., Chicago, Ill.
Rapid-Standard Co., Inc., The, Grand Rapids, Mich.
Standard Conveyor Co., St. Paul, Minn.
Standard-Knapp Corp., Portland, Conn.
Triangle Package Machinery Co., Chicago, Ill.
U. S. Automatic Box Machinery Co. Inc., Boston, Mass.
U. S. Bottlers Machinery Co., Chicago, Ill.
U. S. Rubber Co., New York, N. Y.

CONVEYORS, PORTABLE

Alvey-Ferguson Co., The, Cincinnati, Ohio
Food Machinery Corp., Sprague-Sells Div., Hoopeston, Ill.
Horix Mfg. Co., Pittsburgh, Pa.
Hulbert Engineering Corp., Watertown, Wis.
Jeffrey Mfg. Co., The, Columbus, Ohio
Lamson Corp., Syracuse, N. Y.
Link-Belt Co., Chicago, Ill.
Logan Co., Louisville, Ky.
Mathews Conveyor Co., Ellwood City, Pa.
Paslode Co., Chicago, Ill.
Rapid-Standard Co., Inc., The, Grand Rapids, Mich.

Addresses of companies listed appear on pages 622-630

Scientific Filter Co., New York, N. Y.
Standard Conveyor Co., St. Paul, Minn.
Syntron Co., Homer City, Pa.
U. S. Bottlers Machinery Co., Chicago, Ill.

CORD, CELLULOSE

Blake, Moffitt & Towne, San Francisco, Calif.
Dennison Mfg. Co., Framingham, Mass.
Fibre Cord Co., New York, N. Y.
Sylvania Industrial Corp., New York, N. Y.

CORK SHEETS (Paper-Backed)

Bond Mfg. Corp., Inc., Wilmington, Del.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.

CORKS

Armstrong Cork Co., Lancaster, Pa.
Dodge Cork Co., Inc., Lancaster, Pa.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.

CORKS, ALUMINUM TOP

Armstrong Cork Co., Lancaster, Pa.
Consolidated Fruit Jar Co., New Brunswick, N. J.
Dodge Cork Co., Inc., Lancaster, Pa.

CORKS, MOLDED TOP

Armstrong Cork Co., Lancaster, Pa.
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Davies, Harry Molding Co., Chicago, Ill.
Dodge Cork Co., Inc., Lancaster, Pa.
Mack Molding Co., Wayne, N. J.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.

CORKS, WOOD TOP

Armstrong Cork Co., Lancaster, Pa.
Dodge Cork Co., Inc., Lancaster, Pa.
Mundet Cork Corp. (Closure Div.), Bklyn, N. Y.

DECALCOMANIA

American Decalcomania Co., Chicago, Ill.
Bender, H. P., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Dobeckmun Co., The, Cleveland, Ohio
Foxon Co., The, Providence, R. I.
Howell, F. M. & Co., Elmira, N. Y.
McLaurin-Jones Co., Brookfield, Mass.
Meyercord Co., The, Chicago, Ill.
Palm, Fechteler & Co., New York, N. Y.
Universal Ceramics, New York, N. Y.

DESIGNERS

See Package Design Consultants (Independent Organizations)

DIES, PAPER CUTTING

Badger Merchandising Displays, Inc., Milwaukee, Wis.
Harris-Seybold-Potter Co., Dayton, Ohio
Helmold, J. F. & Bro., Inc., Chicago, Ill.
Indianapolis Paper Container Co., Indianapolis, Ind.
Inman Mfg. Co., Inc., Amsterdam, N. Y.
Lansky Die Cutting Co., New York, N. Y.
Pohlig Bros., Richmond, Va.
U. S. Finishing & Mfg. Co., Chicago, Ill.

DISPENSERS, PUMP

See Sprayers

DISPLAY, MOTION, MECHANISMS

DeNina, James Andrew, New York, N. Y.
Displays, The, New York, N. Y.
Gregory Motors, Inc., New York, N. Y.
Jay Advertising Co., Lancaster, Pa.
Mergenthaler Linotype Co., Bklyn, N. Y.
Motion Displays, Inc., Bklyn, N. Y.
National Carbon Co., Inc., New York, N. Y.
Ruckelshaus & Co., Inc., New York, N. Y.
Speedway Mfg. Co., Cicero, Ill.
Stensgaard, W. L. & Assocs., Chicago, Ill.

DISPLAY MOUNTING AND FINISHING

Arvey Corp., Chicago, Ill.
Badger Merchandising Displays, Inc., Milwaukee, Wis.
Bronzart Metals Co., New York, N. Y.
Chaspec Mfg. Co., New York, N. Y.
Display Finishing Co., Inc., Long Island City, N. Y.
Fibreboard Prods., Inc., San Francisco, Calif.
Lansky Die Cutting Co., New York, N. Y.
Lithographers' Finishing Co., Inc., New York, N. Y.
Merit Display Card Co., New York, N. Y.
Plastics Finishers Corp., Bklyn, N. Y.
Schmidt Litho. Co., San Francisco, Calif.
Schoettle, Edwin J. Co., Phila., Pa.
Schutz, Thom. A. Co., Chicago, Ill.
U. S. Finishing & Mfg. Co., Chicago, Ill.

DISPLAYS, COUNTER

Ace Carton Corp., Cicero, Ill.
Addison Lithographing Co., Rochester, N. Y.
Advertising Metal Display Co., Chicago, Ill.
Arrow Mfg. Co., Inc., Hoboken, N. J.
Arvey Corp., Chicago, Ill.
Autokraft Box Corp., Hanover, Pa.
Badger Merchandising Displays, Inc., Milwaukee, Wis.
Blum Folding Paper Box Co., Inc., Bklyn, N. Y.
Bronzart Metals Co., New York, N. Y.
Brooks & Porter, Inc., New York, N. Y.
Brooks Bank Note Co., Springfield, Mass.
Burt, F. N. Co., Inc., Buffalo, N. Y.
Calvert Lithographing Co., Detroit, Mich.
Casselman, T. E. Inc., New York, N. Y.
Central States Paper & Bag Co., St. Louis, Mo.
Chaspec Mfg. Co., New York, N. Y.
Clark, Geo. V. Co., Inc., Long Island City, N. Y.
Consolidated Box Co., Inc., Tampa, Fla.
Consolidated Lithographing Corp., Bklyn, N. Y.
Container Corp. of America, Chicago, Ill.
DeNina, James Andrew, New York, N. Y.
Densen-Banner Co., Ridgefield Park, N. J.
Design Center, Inc., New York, N. Y.
Display Finishing Co., Inc., Long Island City, N. Y.
Displays, The, New York, N. Y.
Edwards & Deutsch Lithographing Co., Chicago, Ill.
Excelsior Paper Specialties Co., New York, N. Y.
Fairchild, F. E. Corp., Rochester, N. Y.
Federal Carton Corp., New York, N. Y.
Fibreboard Prods., Inc., San Francisco, Calif.
Fitzhugh, Wm. W. Inc., Bklyn, N. Y.
Forbes Lithograph Co., The, Boston, Mass.
Fox, C. J. Co., The, Providence, R. I.
Foxon Co., Providence, R. I.
Gair, Robert Co., Inc., New York, N. Y.
Gaylord Container Corp., St. Louis, Mo.
Gereke-Allen Carton Co., St. Louis, Mo.
Grand-City Container Corp., New York, N. Y.

Gray Wire Specialty Co., The, Cleveland, Ohio
Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
Helmco, Inc., Chicago, Ill.
High Point Paper Box Co., Inc., High Point, N. C.
Hinde & Dauch Paper Co., The, Sandusky, Ohio
Hollywood Paper Box Div., The Flintcote Co., Hollywood, Cal.
Howell, F. M. & Co., Elmira, N. Y.
Interstate Folding Box Co., The, Middletown, Ohio
Kaumagraph Co., Wilmington, Del.
Kay Displays, Inc., New York, N. Y.
Kayton, Robert Displays, Inc., New York, N. Y.
Keystone Box Co., Pittsburgh, Pa.
Kiernan-Hughes Co., Jersey City, N. Y.
Kindred, MacLean & Co., Inc., Long Island City, N. Y.
Lehmann Printing & Litho Co., San Francisco, Calif.
Magill-Weinsheimer Co., Chicago, Ill.
Manders Co., Inc., The, New York, N. Y.
McCandlish Lithograph Corp., Phila., Pa.
Merit Display Card Co., New York, N. Y.
Milprint, Inc., Milwaukee, Wis.
Myers, J. & P. B. Inc., Jersey City, N. J.
Nalco, Inc., New York, N. Y.
National Folding Box Co., New Haven, Conn.
National Metal Edge Box Co., Phila., Pa.
National Printing & Engraving Co., Chicago, Ill.
National Process Co., Inc., The, New York, N. Y.
Nelson, B. F. Mfg. Co., Minneapolis, Minn.
Nevins-Church Press, The, New York, N. Y.
Niagara Lithograph Co., Buffalo, N. Y.
Nicoll & Co., San Francisco, Calif.
Paper Package Co., Indianapolis, Ind.
Oberly & Newell Lithograph Corp., New York, N. Y.
Ohio Boxboard Co., The, Rittman, Ohio
Old Dominion Box Co., Inc., Charlotte, N. C.
Ottawa River Paper Co., The, Toledo, Ohio
Phenix Associates, New York, N. Y.
Pictorial Paper Package Corp., Aurora, Ill.
Pilliod Cabinet Co., The, Swanton, Ohio
Progress Lithographing Co., The, Cincinnati, Ohio
Randolph Paper Box Co., Richmond, Va.
Reyburn Mfg. Co., Inc., The, Phila., Pa.
Reynolds Metals Co., Richmond, Va.
Richardson Taylor-Globe Corp., Cincinnati, Ohio
Robertson Paper Box Co., Inc., Montville, Conn.
Rode & Brand, New York, N. Y.
Rossotti Lithographing Co., Inc., North Bergen, N. J.
Sample-Durick Co., Inc., Indian Orchard, Mass.
Scandore Paper Box Co., Inc., Bklyn, N. Y.
Schmidt Lithograph Co., San Francisco, Calif.
Schoettle, Edwin J. Co., Phila., Pa.
Schutz, Thom. A. Co., Chicago, Ill.
Smith, S. K. Co., Chicago, Ill.
Stecher-Traung Lithograph Corp., Rochester, N. Y.
Stensgaard, W. L. & Associates, Chicago, Ill.
Strobridge Lithographing Co., The, Cincinnati, Ohio
Superior Folding Box Co., St. Louis, Mo.
Transparent Specialties Corp., Cleveland, Ohio
Union Steel Products Co., Albion, Mich.
United States Printing & Lithograph Co., The, Cincinnati, Ohio
Walco Plastics, E. Orange, N. J.
Waldorf Paper Products Co., St. Paul, Minn.

Warner Brothers Co., The, Bridgeport, Conn.
 Wilkata Folding Box Co., Kearny, N. J.
 Wilson Paper Box Co., Inc., Richmond, Va.
 Zipprodt, Inc., Chicago, Ill.
 Zumbiel, C. W. Co., The, Cincinnati, Ohio

DISPLAYS, COUNTER (Of Glass and Wood)

Arrow Mfg. Co., Inc., Hoboken, N. J.
 Autokraft Box Corp., Hanover, Pa.
 Badger Merchandising Displays, Inc., Milwaukee, Wis.
 Bronzart Metals Co., New York, N. Y.
 Chaspec Mfg. Co., New York, N. Y.
 DeNina, James Andrew, New York, N. Y.
 Design Center, Inc., New York, N. Y.
 Displayers, The, New York, N. Y.
 Gutterson & Co., Inc., New York, N. Y.
 Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
 Helmco, Inc., Chicago, Ill.
 Kay Displays, Inc., New York, N. Y.
 Kayton, Robert Displays, Inc., New York, N. Y.
 New England Box Co., Greenfield, Mass.
 Nicoll & Co., San Francisco, Calif.
 Pilliod Cabinet Co., The, Swanton, Ohio
 Schunack, C. E. Inc., Meriden, Conn.
 Schutz, Thom. A. Co., Chicago, Ill.
 Stensgaard, W. L. & Assocs., Chicago, Ill.

DISPLAYS, FLOOR STAND (Corrugated & Solid Fibre)

American Box Board Co., Grand Rapids, Mich.
 Badger Merchandising Displays, Inc., Milwaukee, Wis.
 Container Corp. of America, Chicago, Ill.
 Continental Container Corp., Bklyn, N. Y.
 Display Finishing Co., Inc., Long Island City, N. Y.
 Eddy Paper Corp., Chicago, Ill.
 Edwards & Deutsch Lithographing Co., Chicago, Ill.
 Excelsior Paper Specialties Co., New York, N. Y.
 Federal Carton Corp., New York, N. Y.
 Fibreboard Prods., Inc., San Francisco, Calif.
 Gair, Robert Co., Inc., New York, N. Y.
 Gaylord Container Corp., St. Louis, Mo.
 Gereke-Allen Carton Co., St. Louis, Mo.
 Grand-City Container Corp., New York, N. Y.
 Hankins Container Co., Cleveland, Ohio
 Helmco, Inc., Chicago, Ill.
 Hinde & Dauch Paper Co., The, Sandusky, Ohio
 Inland Container Corp., Indianapolis, Ind.
 Kay Displays, Inc., New York, N. Y.
 Kayton, Robert Displays, Inc., New York, N. Y.
 Keystone Box Co., Pittsburgh, Pa.
 Kress, F. J. Box Co., Pittsburgh, Pa.
 Magill-Weinsheimer Co., Chicago, Ill.
 Milprint, Inc., Milwaukee, Wis.
 National Container Corp., Long Island City, N. Y.
 Nelson, B. F. Mfg. Co., Minneapolis, Minn.
 Niagara Lithograph Co., Buffalo, N. Y.
 Oberly & Newell Lithograph Corp., New York, N. Y.
 Ohio Boxboard Co., The Rittman, Ohio
 Old Dominion Box Co., Inc., Charlott, N. C.
 Ottawa River Paper Co., The, Toledo, Ohio
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
 Schmidt Lithograph Co., San Francisco, Calif.
 Schutz, Thom. A. Co., Chicago, Ill.
 Sherman Paper Products Corp., Newton Upper Falls, Mass.
 Stensgaard, W. L. & Associates, Chicago, Ill.
 Waldorf Paper Products Co., St. Paul, Minn.

DISPLAYS, LITHOGRAPHS

See Lithographers

DISPLAYS, METAL, SHEET

Advertising Metal Display Co., Chicago, Ill.
 American Can Co., New York, N. Y.
 Bronzart Metals Co., New York, N. Y.
 Design Center, Inc., New York, N. Y.
 Farrington Mfg. Co., Boston, Mass.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Heekin Can Co., Cincinnati, Ohio
 Helmco, Inc., Chicago, Ill.
 Kay Displays, Inc., New York, N. Y.
 Kayton, Robert Displays, Inc., New York, N. Y.

DISPLAYS, WIRE

Colwell, Lawrence J., New York, N. Y.
 Gray Wire Specialty Co., The, Cleveland, Ohio
 Union Steel Products Co., Albion, Mich.
 Washburn Co., The, Worcester, Mass.

DROPPERS, BOTTLE

Anchor Hocking Glass Corp., Lancaster, Ohio
 Armstrong Cork Co., Lancaster, Pa.
 Glass Industries, Inc., New York, N. Y.
 Kimble Glass Co., Vineland, N. J.
 Owens-Illinois Glass Co., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., San Francisco, Calif.
 Pennsylvania Glass Products Co., Pittsburgh, Pa.
 Price, M. B. Associates, New York, N. Y.

DRUMS, FIBRE

Bird & Son, Inc., East Walpole, Mass.
 Canister Co., The, Phillipsburg, N. J.
 Carpenter Container Corp., Bklyn, N. Y.
 Cleveland Container Co., The, Cleveland, Ohio
 Consolidated Paper Co., Monroe, Mich.
 Container Co., The, Van Wert, Ohio
 Container Corp. of America, Chicago, Ill.
 Fibreboard Prods., Inc., San Francisco, Calif.
 Gardner-Richardson Co., The, Middletown, Ohio
 Gates Paper Co., Ltd., The, Los Angeles, Calif.
 Gaylord Container Corp., St. Louis, Mo.
 Keystone Fibre Drum Co., Pittsburgh, Pa.
 Master Package Corp., The, Owen, Wis.

DRUMS, METAL

Aluminum Co. of America, Pittsburgh, Pa.
 American Can Co., New York, N. Y.
 Continental Can Co., New York, N. Y.
 Crown Can Co., Phila., Pa.
 Ellis, George D. & Sons, Inc., Phila., Pa.
 Heekin Can Co., Cincinnati, Ohio
 Owens-Illinois Can Co., Toledo, Ohio
 Republic Steel Corp., Cleveland, Ohio
 Wheeling Corrugating Co., Wheeling, W. Va.
 Wilson & Bennett Mfg. Co., The, Chicago, Ill.

DRUMS, PLYWOOD

Seymour & Peck Co., Chicago, Ill.

EMBOSSING ROLLS, PAPER

Bingham Bros. Co., New York, N. Y.
 Hudson-Sharp Machine Co., Green Bay, Wis.
 Marconetti, A. E. Inc., New York, N. Y.
 Waldron, John Corp., New Brunswick, N. J.

ENVELOPES, CLOTH & COTTON-LINED PAPER

American Paper Goods Co., The, Kensington, Conn.
 Andrews, P. L. Corp., Bklyn, N. Y.
 Cottonluxe Mfg. Co., New York, N. Y.
 Herz, Alexander Co., Inc., New York, N. Y.
 Tension Envelope Corp., New York, N. Y.
 U. S. Envelope Co., Springfield, Mass.
 Varey-Shea Bag Corp., Elizabeth, N. J.

ENVELOPES, TRANSPARENT

Alderman Paper Box Corp., Rochester, N. Y.
 American Paper Goods Co., The, Kensington, Conn.
 Andrews, P. L. Corp., Bklyn, N. Y.
 Berkowitz Envelope Co., Kansas City, Mo.
 Clark, Geo. V. Co., Inc., Long Island City, N. Y.
 Comet Envelope & Paper Co., Inc., New York, N. Y.
 Continental Bag Spec. Corp., New York, N. Y.
 Crystal Transparent Mfg. Co., Inc., New York, N. Y.
 Cupples-Hesse Corp., St. Louis, Mo.
 Dennison Mfg. Co., Framingham, Mass.
 Dobeckmun Co., The, Cleveland, Ohio
 Herz, Alexander Co., Inc., New York, N. Y.
 Humitube Mfg. Co., Peoria, Ill.
 Mason Envelope Co., New York, N. Y.
 Milprint, Inc., Milwaukee, Wis.
 Munson Bag Co., The, Cleveland, Ohio
 Neostyle, Inc., Chicago, Ill.
 Oneida Paper Products, Inc., New York, N. Y.
 Print-A-Tube Co., Passaic, N. J.
 Royal, Thomas M. & Co., Phila., Pa.
 Seaman Box Co., New York, N. Y.
 Shellmar Products Co., Mt. Vernon, Ohio
 Tension Envelope Corp., New York, N. Y.
 Tower Envelope Co., New York, N. Y.
 Trans-Pac Services, Inc., New York, N. Y.
 Traver Corp., Chicago, Ill.
 U. S. Envelope Co., Springfield, Mass.

EXCELSIOR, PAPER

See also Transparent Materials, Shredded

Ben Mont Papers, Inc., Bennington, Vt.
 Crystal Tissue Co., The, Middletown, Ohio
 Excelsior Paper Specialties Co., New York, N. Y.
 Inland Container Corp., Indianapolis, Ind.
 Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
 Newark Paraffine & Parchment Paper Co., Newark, N. J.
 Specialty Papers Co., Dayton, Ohio
 Sweetnam, Geo. H. Inc., Cambridge, Mass.
 Sylvania Industrial Corp., New York, N. Y.

FINISHERS, CUSTOM

See Paper Finishers (Lacquers & Varnishes)

FINISHERS, DISPLAY

See Display Mounting & Finishing

FLOCKING

Cambridge Paper Box Co., Cambridge, Mass.
 Cellusuede Products, Inc., Rockford, Ill.
 Chaspec Mfg. Co., New York, N. Y.
 Eppy, Samuel Inc., New York, N. Y.

FOIL, METAL

Aluminum Co. of America, Pittsburgh, Pa.

Addresses of companies listed appear on pages 622-630

Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Keller-Dorian Corp., New York, N. Y.
Pauli, Karl Corp., New York, N. Y.
Reynolds Metals Co., Richmond, Va.

GLASS, ROD & TUBING

Corning Glass Works, Corning, N. Y.
Glass Industries, Inc., New York, N. Y.
Kimble Glass Co., Vineland, N. J.
Pennsylvania Glass Products Co., Pittsburgh, Pa.

GLUES & PASTES

See Adhesives

GOLD LEAF

See Roll Leaf

HAMMERS & TACKERS, AUTOMATIC FEED

Acme Staple Co., Camden, N. J.
Bostitch, Inc., E. Greenwich, R. I.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
Paslode Co., Chicago, Ill.

INKS, GRAVURE

American Printing Ink Co., Div. General Printing Ink Corp., Chicago, Ill.
California Ink Co., Inc., San Francisco, Calif.
Crescent Ink & Color Co. of Pa., Phila., Pa.
General Printing Ink Corp., New York, N. Y.
Huber, J. M. Inc., New York, N. Y.
In-Tag Division of Interchemical Corp., New York, N. Y.
Levy, Fred'k H. Co., Inc., New York, N. Y.
Roosen, H. D. Ink Co., Bklyn, N. Y.
Rotogravure Div., General Printing Ink Corp., New York, N. Y.
Sinclair & Valentine Co., New York, N. Y.

INKS, LETTERPRESS & LITHOGRAPHIC

Acme Printing Ink Co., Chicago, Ill.
American Printing Ink Co., Div. General Printing Ink Corp., Chicago, Ill.
Auld, Hampton Inc., Newark, N. J.
Barta-Griffin Co., Worcester, Mass.
Bensing Bros. & Deeney, Phila., Pa.
Braden-Sutphin Ink Co., Cleveland, Ohio
California Ink Co., San Francisco, Calif.
Capitol Printing Ink Co., Inc., Washington, D. C.
Carlson, John P. Inc., Bklyn, N. Y.
Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Crescent Ink & Color Co., Phila., Pa.
Driscoll, Martin & Co., Chicago, Ill.
Eagle Printing Ink Co., Div. General Printing Ink Corp., New York, N. Y.
Flint, Howard Ink Co., Detroit, Mich.
Fuchs & Lang Mfg. Co., Div. General Printing Ink Corp., New York, N. Y.
Gaetjens, Berger & Wirth, Bklyn, N. Y.
General Printing Ink Corp., New York, N. Y.
Grady & Neary Co., Chicago, Ill.
Hellmuth, Charles Printing Ink Corp., New York, N. Y.
Hill-Hentschel Co., St. Louis, Mo.
Hilton-Davis Co., Cincinnati, Ohio
Huber, J. M. Inc., New York, N. Y.
International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Johnson, Chas. Eneu & Co., Phila., Pa.
Kelly, E. J. Co., Kalamazoo, Mich.
Kohn & Madden Printing Ink Co., Chicago, Ill.
Levey, Fred'k H. Co., New York, N. Y.

Manufacturers Printing Ink Corp., Bklyn, N. Y.
Morrill, Geo. H. Co., Div. General Printing Ink Corp., New York, N. Y.
Pacific Printing Ink Co., San Francisco, Calif.
Pope & Gray, Inc., New York, N. Y.
Roberts, Lewis Inc., Newark, N. J.
Roosen, H. D. Ink Co., Bklyn, N. Y.
Schwarm & Jacobus Co., Cincinnati, Ohio
Siebold, J. H. & G. B. Inc., New York, N. Y.
Sinclair & Carroll Co., New York, N. Y.
Sinclair & Valentine Co., New York, N. Y.
Sleight Metallic Ink Co., Phila. Pa.
Sleight Metallic Ink Co. of Ill., Chicago, Ill.
Superior Printing Ink Co., Inc., New York, N. Y.
Triangle Ink & Color Co., Bklyn, N. Y.
Ullman, Sigmund Co., Div. General Printing Ink Corp., New York, N. Y.
Wilson, W. D. Printing Ink Co., Long Island City, N. Y.

JARS, GLASS

Anchor Hocking Glass Corp., Lancaster, Ohio
Armstrong Cork Co., Lancaster, Pa.
Ball Brothers Co., Muncie, Ind.
Braun, W. Co., Chicago, Ill.
Brockway Glass Co., Brockway, Pa.
Carr-Lowrey Glass Co., Baltimore, Md.
Glass Containers, Inc., Los Angeles, Calif.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Kimble Glass Co., Vineland, N. J.
Owens-Illinois Glass Co., Toledo, Ohio
Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Pennsylvania Glass Products Co., Pittsburgh, Pa.
Swindell Brothers, Baltimore, Md.
Wheaton, T. C. Co., Millville, N. J.

JARS, OPAL

Anchor Hocking Glass Corp., Lancaster, Ohio
Braun, W. Co., Chicago, Ill.
Carr-Lowrey Glass Co., Baltimore, Md.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Kimble Glass Co., Vineland, N. J.
Wheaton, T. C. Co., Millville, N. J.

LABELS, FOIL

American Colortype Co., Chicago, Ill.
Andersen, A. J., Chicago, Ill.
Attleboro Printing & Embossing Co., Inc., Attleboro, Mass.
Bartlett Label Co., Kalamazoo, Mich.
Cameo Die & Label Co., New York, N. Y.
Craftsman Label Co., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Ever Ready Label Corp., New York, N. Y.
Fleming-Potter Co., Inc., Peoria, Ill.
Foxon Co., The, Providence, R. I.
Grammes, L. F. & Sons, Inc., Allentown, Pa.
Grand Rapids Label Co., Grand Rapids, Mich.
Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Kaumagraph Co., Wilmington, Del.
Krause, Richard M. Inc., New York, N. Y.
Lambooy Label & Wrapper Co., Kalamazoo, Mich.
Milwaukee Label & Seal Co., Milwaukee, Wis.
Nevins-Church Press, The, New York, N. Y.
Pacific Label Co., Los Angeles, Calif.
Pollock Paper & Box Co., Dallas, Tex.
Reyburn Mfg. Co., Inc., The, Phila., Pa.
Reynolds Metals Co., Richmond, Va.
Robinson Tag & Label Co., New York, N. Y.
St. Louis Sticker Co., St. Louis, Mo.
Schmidt, Henry & Bro., Inc., Phila., Pa.
Tablet & Ticket Co., The, Chicago, Ill.

Tompkins' Label Service, Phila., Pa.
Unique Printed Products Co., Inc., Terre Haute, Ind.
Warner Brothers Co., The, Bridgeport, Conn.
Wheeler-Van Label Corp., Grand Rapids, Mich.
Wynekoop, Walker Co., Chicago, Ill.

LABELS, PRINTED & LITHOGRAPHED

Addison Lithographing Co., Rochester, N. Y.
American Colortype Co., Chicago, Ill.
Andersen, A. J., Chicago, Ill.
Bartlett Label Co., Kalamazoo, Mich.
Brooks & Porter, Inc., New York, N. Y.
Brooks Bank Note Co., Springfield, Mass.
Burt, F. N. Co., Inc., Buffalo, N. Y.
Calvert Lithographing Co., Detroit, Mich.
Cameo Die & Label Co., New York, N. Y.
Central Lithograph Co., The, Cleveland, Ohio
Chaspec Mfg. Co., New York, N. Y.
Consolidated Lithographing Corp., Bklyn, N. Y.
Craftsman Label Co., New York, N. Y.
Crockier Union, San Francisco, Calif.
Dennison Mfg. Co., Framingham, Mass.
Economy Novelty & Printing Co., New York, N. Y.
Edwards & Deutsch Lithographing Co., Chicago, Ill.
Empire Lithographing Co., Inc., New York, N. Y.
Eureka Specialty Printing Co., Scranton, Pa.
Ever Ready Label Corp., New York, N. Y.
Fairchild, E. E. Corp., Rochester, N. Y.
Fibreboard Prods., Inc., San Francisco, Calif.
Fitzhugh, Wm. W. Inc., Bklyn, N. Y.
Fleming-Potter Co., Inc., Peoria, Ill.
Forbes Lithograph Co., The, Boston, Mass.
Gamse Lithographing Co., Inc., Baltimore, Md.
Grand Rapids Label Co., Grand Rapids, Mich.
Howell, F. M. & Co., Elmira, N. Y.
Kaumagraph Co., Wilmington, Del.
Kindred, MacLean & Co., Inc., Long Island City, N. Y.
Krause, Richard M. Inc., New York, N. Y.
Lambooy Label & Wrapper Co., Kalamazoo, Mich.
Lehman Printing and Litho. Co., San Francisco, Calif.
Magill-Weinsheimer Co., Chicago, Ill.
Michigan Litho. Co., Grand Rapids, Mich.
Milwaukee Label & Seal Co., Milwaukee, Wis.
Muirson Label Co., Inc., Bklyn, N. Y.
Nashua Package Sealing Co., Inc., Nashua, N. H.
National Color Printing Co., Inc., The, Baltimore, Md.
National Process Co., New York, N. Y.
Nevins-Church Press, New York, N. Y.
Pictorial Paper Package Corp., Aurora, Ill.
Pollock Paper & Box Co., Dallas, Tex.
Progress Lithographing Co., The, Cincinnati, Ohio
Rexford Paper Co., Milwaukee, Wis.
Reyburn Mfg. Co., Inc., Phila., Pa.
Reynolds Metals Co., Richmond, Va.
Robinson Tag & Label Co., New York, N. Y.
Rode & Brand, New York, N. Y.
Rossotti Lithographing Co., Inc., North Bergen, N. J.
St. Louis Sticker Co., St. Louis, Mo.
Schmidt, Henry & Bro., Inc., Phila., Pa.
Schmidt Lithograph Co., San Francisco, Calif.
Stecher-Traug Lithograph Corp., Rochester, N. Y.
Tompkins' Label Service, Phila., Pa.
Trade Lithograph & Printing Co., Inc., New York, N. Y.

Trautmann, Bailey & Blampey, New York, N. Y.
 Unique Printed Products Co., Inc., Terre Haute, Ind.
U. S. Printing & Lithograph Co., Cincinnati, Ohio
 Waddill Printing & Lithographing Co., Danville, Va.
 Waldorf Paper Products Co., St. Paul, Minn.
Warner Bros. Co., The, Bridgeport, Conn.
Wheeler-Van Label Corp., Grand Rapids, Mich.
 Wilkata Folding Box Co., Kearny, N. J.
 Wilmanns Bros. Co., Milwaukee, Wis.

LABELS, ROLL

(For Shipping, Marking, Etc.)

Attleboro Printing & Embossing Co., Inc., Attleboro, Mass.
 Bartlett Label Co., Kalamazoo, Mich.
 Economy Novelty & Printing Co., New York, N. Y.
Ever Ready Label Corp., New York, N. Y.
 Grand Rapids Label Co., Grand Rapids, Mich.
 Ketcham, Howard Inc., New York, N. Y.
 Krause, Richard M. Inc., New York, N. Y.
 Lambooy Label & Wrapper Co., Kalamazoo, Mich.
Oliver Machinery Co., Grand Rapids, Mich.
 Pollock Paper & Box Co., Dallas, Tex.
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
 Tompkins Label Service, Phila., Pa.
 Unique Printed Products Co., Inc., Terre Haute, Ind.

LABELS, SHIPPING

Bartlett Label Co., Kalamazoo, Mich.
Dennison Mfg. Co., Framingham, Mass.
 Economy Novelty & Printing Co., New York, N. Y.
Ever Ready Label Corp., New York, N. Y.
 Fleming-Potter Co., Inc., Peoria, Ill.
 Grand Rapids Label Co., Grand Rapids, Mich.
 Howell, F. M. & Co., Elmira, N. Y.
 Lambooy Label & Wrapper Co., Kalamazoo, Mich.
 Lehmann Printing & Litho. Co., San Francisco, Calif.
 Milwaukee Label & Seal Co., Milwaukee, Wis.
 Nashua Package Sealing Co., Inc., Nashua, N. H.
 Pictorial Paper Package Corp., Aurora, Ill.
 Rexford Paper Co., Milwaukee, Wis.
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
 Robinson Tag & Label Co., New York, N. Y.
 St. Louis Sticker Co., St. Louis, Mo.
 Tablet & Ticket Co., The, Chicago, Ill.
 Tompkins' Label Service, Phila., Pa.
 Unique Printed Products Co., Inc., Terre Haute, Ind.
Wheeler-Van Label Corp., Grand Rapids, Mich.

LABELS, STOCK, LITHOGRAPHED

(Vinyette, Etc.)

Bartlett Label Co., Kalamazoo, Mich.
 Consolidated Litho. Corp., Bklyn, N. Y.
 Crocker Union, San Francisco, Calif.
 Empire Lithographing Co., Inc., New York, N. Y.
 Gamse Lithographing Co., Inc., Baltimore, Md.
 Kaunagraph Co., Wilmington, Del.
 Lambooy Label & Wrapper Co., Kalamazoo, Mich.
 Lehman Printing & Litho. Co., San Francisco, Calif.
 Muirson Label Co., Inc., Bklyn, N. Y.
 Reyburn Mfg. Co., Inc., Phila., Pa.

Rossotti Lithographing Co., N. Bergen, N. J.
 Schmidt Lithograph Co., San Francisco, Calif.
 Stecher-Traung Lithograph Corp., Rochester, N. Y.
 Strobridge Lithographing Co., The, Cincinnati, Ohio
 Tompkins' Label Service, Phila., Pa.
 Unique Printed Products Co., Inc., Terre Haute, Ind.
U. S. Printing & Lithograph Co., Cincinnati, Ohio
 Waddill Printing & Lithographing Co., Danville, Va.

LABELS, TRANSPARENT

Bender, H. P., New York, N. Y.
 Cellulose Packaging Corp., New York, N. Y.
 Crystal Transparent Mfg. Co., Inc., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Dobeckmun Co., The, Cleveland, Ohio
Ever Ready Label Corp., New York, N. Y.
Foxon Co., The, Providence, R. I.
 Milprint, Inc., Milwaukee, Wis.
 Milwaukee Label & Seal Co., Milwaukee, Wis.
Neostyle, Inc., Chicago, Ill.
Palm, Fechteler & Co., New York, N. Y.
 Paramount Paper Prods. Co., Inc., Phila., Pa.
 Robinson Tag & Label Co., New York, N. Y.
 St. Louis Sticker Co., St. Louis, Mo.
Shellmar Products Co., Mt. Vernon, Ohio
 Tablet & Ticket Co., The, Chicago, Ill.
 Tompkins' Label Service, Phila., Pa.
 Unique Printed Products Co., Inc., Terre Haute, Ind.

LABORATORIES, RESEARCH & TESTING, INDEPENDENT

Analytical Laboratory, The, Jersey City, N. J.
 Bowser-Morner Testing Laboratories, Dayton, Ohio
 California Testing Laboratories, Los Angeles, Calif.
 Columbus Laboratories, The, Chicago, Ill.
 Container Testing Laboratories, Inc., New York, N. Y.
 Dumas Laboratory, The, Atlanta, Ga.
 Detroit Testing Laboratory, The, Detroit, Mich.
 Laucks Laboratories, Inc., Seattle, Wash.
 LaWall and Harrison, Phila., Pa.
 Little, Arthur D. Inc., Cambridge, Mass.
 Los Angeles Testing Laboratory, Los Angeles, Calif.
 Maffitt, Howard C., Des Moines, Ia.
 National Cannery Laboratory, Pittsburgh, Pa.
 New York Testing Laboratories, New York, N. Y.
 Northwest Testing Laboratories, Seattle, Wash.
 Osborne, Raymond G. Laboratories, Los Angeles, Calif.
 Pitkin, Lucius Inc., New York, N. Y.
 Pittsburgh Testing Laboratory, Pittsburgh, Pa.
 Quinn, Don L. Co., The, Chicago, Ill.
 Smith-Emery Co., Los Angeles, Calif.
 Smith-Emery & Co., San Francisco, Calif.
 Twining Laboratories, The, Fresno, Calif.
 United States Testing Co., Inc., Hoboken, N. J.

LACQUERS & VARNISHES

See Coatings, Protective

LAMINATING, CUSTOM

Arvey Corp., Chicago, Ill.
 Butterfield-Barry Co., Inc., New York, N. Y.

Deerfield Glassine Co., Monroe Bridge, Mass.
Dobeckmun Co., The, Cleveland, Ohio
 General Laminating, Inc., New York, N. Y.
 Interstate Folding Box Co., Middletown, Ohio
Jaypaco Co., New York, N. Y.
 Laminating Corp., Chicago, Ill.
 Laminoid, Inc., North Bergen, N. J.
 McLaurin-Jones Co., Brookfield, Mass.
 Menasha Products Co., The, Menasha, Wis.
 Miller Paper Co., New York, N. Y.
 Mor-Gan Laminating & Foliating Co., New York, N. Y.
 New York Laminating Co., Irvington, N. J.
 Plastics Finishing Corp., Bklyn, N. Y.
Port Huron Sulphite & Paper Co., Port Huron, Mich.
Salwen, Joe Paper Co., New York, N. Y.
Shellmar Products Co., Mt. Vernon, Ohio
Shoup-Owens, Inc., Hoboken, N. J.
 U. S. Finishing & Mfg. Co., Chicago, Ill.
 Walser Mfg. Co., The, Clifton, N. J.
Westfield River Paper Co., Inc., Russell, Mass.

LEATHERETTE

See also Paper, Imitation Leather

Atlas Powder Co., Zapon-Keratol Div., Stamford, Conn.
 Columbus Coated Fabrics Corp., Columbus, Ohio
 Dejonge, Louis & Co., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
 Griffin, Campbell, Hayes, Walsh, Inc., New York, N. Y.
 Holliston Mills, Inc., The, Norwood, Mass.
 Pyrotex Leather Co., Leonister, Mass.
 Textileather Corp., Toledo, Ohio
 U. S. Rubber Co., New York, N. Y.
 Williams, Chas. W. & Co., Inc., New York, N. Y.

LINERS, BOX, BARREL AND BAG

Angier Corp., Framingham, Mass.
 Arkell Safety Bag Co., New York, N. Y.
 Bemis Bro. Bag Co., St. Louis, Mo.
Betner, Benj. C. Co., Devon, Pa.
 Central Waxed Paper Co., Chicago, Ill.
 Dejonge, Louis & Co., New York, N. Y.
Dobeckmun Co., The, Cleveland, Ohio
 Fibreboard Products, Inc., San Francisco, Calif.
Fitchburg Paper Co., Fitchburg, Mass.
 Fulton Bag & Cotton Mills, Atlanta, Ga.
Gardner-Richardson Co., The, Middletown, Ohio
Inland Container Corp., Indianapolis, Ind.
 Interstate Folding Box Co., Middletown, Ohio
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
 LaBoiteaux Co., Inc., The, Cincinnati, Ohio
 Matthias Paper Corp., Phila., Pa.
 Menasha Products Co., The, Menasha, Wis.
 Paterson Parchment Paper Co., Bristol, Pa.
 Pollock Paper & Box Co., Dallas, Tex.
 Rexford Paper Co., Milwaukee, Wis.
 Reynolds Metals Co., Richmond, Va.
Riegel Paper Corp., New York, N. Y.
 St. Regis Paper Co., New York, N. Y.
 Schmidt Lithograph Co., San Francisco, Calif.
Shellmar Products Co., Mt. Vernon, Ohio
Sherman Paper Products Corp., Newton Upper Falls, Mass.
 Sweetnam, Geo. H. Inc., Cambridge, Mass.
 Traver Corp., Chicago, Ill.
 Williams, Chas. W. & Co., Inc., New York, N. Y.

LINERS, CLOSURE

See Closure Liners

Addresses of companies listed appear on pages 622-630

PACKAGING CATALOG

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LITHOGRAPHERS

Addison Lithographing Co., Rochester, N. Y.
 Bones & Mayer, Phila., Pa.
Brooks & Porter, Inc., New York, N. Y.
 Brooks Bank Note Co., Springfield, Mass.
Burt, F. N. Co., Inc., Buffalo, N. Y.
 Calver Lithographing Co., Detroit, Mich.
 Central Lithograph Co., Cleveland, Ohio
 Consolidated Lithographing Corp., Bklyn, N. Y.
 Continental Lithograph Corp., Cleveland, Ohio
 Crocker Union, San Francisco, Calif.
 Edwards & Deutsch Lithographing Co., Chicago, Ill.
 Einson-Freeman Co., Inc., Long Island City, N. Y.
 Empire Lithographing Co., Inc., New York, N. Y.
 Eureka Specialty Printing Co., Scranton, Pa.
 Fairchild, E. E. Corp., Rochester, N. Y.
 Fitzhugh, Wm. W. Inc., Bklyn, N. Y.
 Fleming-Potter Co., Inc., Peoria, Ill.
Forbes Lithograph Co., The, Boston, Mass.
 Gamse Lithographing Co., Inc., Baltimore, Md.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Howell, F. M. & Co., Grand Rapids, Mich.
 Kaumagraph Co., Wilmington, Del.
Kindred, MacLean & Co., Inc., Long Island City, N. Y.
 Lehman Printing & Litho. Co., San Francisco, Calif.
 Magill-Weinsheimer Co., Chicago, Ill.
 McCandish Lithograph Corp., Phila., Pa.
 Michigan Litho. Co., Grand Rapids, Mich.
 Milprint, Inc., Milwaukee, Wis.
National Color Printing Co., Inc., The, Baltimore, Md.
 National Printing & Engraving Co., Chicago, Ill.
 National Process Co., New York, N. Y.
 Niagara Lithograph Co., Buffalo, N. Y.
 Oberly & Newell Lithograph Corp., New York, N. Y.
 Penn Lithographing Co., Phila., Pa.
 Pictorial Paper Package Corp., Aurora, Ill.
 Progress Lithographing Co., The, Cincinnati, Ohio
 Rode & Brand, New York, N. Y.
 Rossotti Lithographing Co., North Bergen, N. J.
 Schmidt Lithograph Co., San Francisco, Calif.
 Stecher-Traung Lithograph Corp., Rochester, N. Y.
 Strobbridge Lithographing Co., The, Cincinnati, Ohio
 Trade Lithograph & Printing Co., Inc., New York, N. Y.
 Trautmann, Bailey & Blampey, New York, N. Y.
U. S. Printing & Lithograph Co., Cincinnati, Ohio
 Waddill Printing & Lithographing Co., Danville, Va.
 Wilmanns Bros. Co., Milwaukee, Wis.
 Zipprodt, Inc., Chicago, Ill.

MACHINES, AMPOULE WASHER

Lakso Company, Fitchburg, Mass.

MACHINES, BAG & ENVELOPE (Filling)

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
Arenco Machine Co., Inc., New York, N. Y.
 Automatic Scale Co., Inc., New York, N. Y.
Bagpak, Inc., New York, N. Y.
Brown Bag Filling Machine Co., The, Fitchburg, Mass.
 Consolidated Packaging Machinery Corp., Buffalo, N. Y.

Exact Weight Scale Co., The, Columbus, Ohio
Ferguson, J. L. Co., Joliet, Ill.
 Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
 Goat, Fred Co., Inc., The, Bklyn, N. Y.
 Gump, B. F. Co., Chicago, Ill.
 International Paper Products Div. of International Paper Co., New York, N. Y.
Ivers-Lee Co., Newark, N. J.
 Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Pneumatic Scale Corp., Ltd., North Quincy, Mass.
Redington, F. B. Co., Chicago, Ill.
Richard Machine Co., Battle Creek, Mich.
 St. Regis Paper Co., New York, N. Y.
Stokes & Smith Co., Phila., Pa.
Triangle Package Machinery Co., Chicago, Ill.
 U. S. Automatic Box Machinery Co., Inc., Boston, Mass.
 Weigh Right Automatic Scale Co., Joliet, Ill.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, BAG & ENVELOPE (Making)

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
Harris-Seybold-Potter Co., Dayton, Ohio
 Hayssen Mfg. Co., Sheboygan, Wis.
 Heinrich, H. H. Inc., New York, N. Y.
Hudson-Sharp Machine Co., Green Bay, Wis.
Ivers-Lee Co., Newark, N. J.
 Miller Wrapping & Sealing Machine Co., Chicago, Ill.
 Modern Containers, Inc., Los Angeles, Calif.
Package Machinery Co., Springfield, Mass.
Peters Machinery Co., Chicago, Ill.
Pneumatic Scale Corp., Ltd., North Quincy, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
Richard Machine Co., Battle Creek, Mich.
 Smith & Winchester Mfg. Co., S. Windham, Conn.
 Smithe, F. L. Machine Co., Inc., New York, N. Y.
 Staude, E. G. Mfg. Co., St. Paul, Minn.
Stokes & Smith Co., Philadelphia, Pa.
Triangle Package Machinery Co., Chicago, Ill.
 U. S. Automatic Box Machinery Co., Inc., Boston, Mass.
 Waldron, John Corp., New Brunswick, N. J.
 Weber, H. G. & Co., Inc., Kiel, Wis.
 Wrap-Ade Machine Co., Inc., Newark, N. J.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, BAG & ENVELOPE (Sealing)

Acme Staple Co., Camden, N. J.
 Amsco Packaging Machinery, Inc., Long Island City, N. Y.
Arenco Machine Co., Inc., New York, N. Y.
Bagpak, Inc., New York, N. Y.
 Bemis Bro. Bag Co., St. Louis, Mo.
Betner, Benj. C. Co., Devon, Pa.
 Bostitch, Inc., East Greenwich, R. I.
 Cleveland Crimping Press Co., Cleveland, Ohio
Consolidated Packaging Machinery Corp., Buffalo, N. Y.
 Container Equipment Corp., Newark, N. J.
 Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
 Goat, Fred Co., Inc., The, Bklyn, N. Y.
 Gump, B. F. Co., Chicago, Ill.
Harris-Seybold-Potter Co., Dayton, Ohio
 Heat Seal-It Co., Phila., Pa.
 International Paper Products Div. of International Paper Co., New York, N. Y.

Ivers-Lee Co., Newark, N. J.
 Miller Wrapping & Sealing Machine Co., Chicago, Ill.
 Modern Containers, Inc., Los Angeles, Calif.
 Pack-Rite Machine Corp., Milwaukee, Wis.
Pneumatic Scale Corp., Ltd., North Quincy, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
Redington, F. B. Co., Chicago, Ill.
Richard Machine Co., Battle Creek, Mich.
 St. Regis Paper Co., New York, N. Y.
 Saranac Mach. Co., Benton Harbor, Mich.
Stokes & Smith Co., Phila., Pa.
Triangle Package Machy. Co., Chicago, Ill.
 Wrap-Ade Machine Co., Inc., Newark, N. J.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, BAG SEWING

Bagpak, Inc., New York, N. Y.
Consolidated Packaging Machinery Corp., Buffalo, N. Y.
 International Paper Products Div. of International Paper Co., New York, N. Y.
 Potdevin Machine Co., Bklyn, N. Y.
 St. Regis Paper Co., New York, N. Y.

MACHINES, BAG STAPLING

Acme Staple Co., Camden, N. J.
Acme Steel Co., Chicago, Ill.
 Bates Mfg. Co., The, New York, N. Y.
 Bostitch, Inc., East Greenwich, R. I.
Dexter Folder Co., New York, N. Y.
 Globe Mfg. Co., Phila., Pa.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
 Paslode Co., Chicago, Ill.
 Saranac Machine Co., Benton Harbor, Mich.

MACHINES, BANDING & WIRE STRAPPING

Acme Steel Co., Chicago, Ill.
 Gerrard Co., Inc., The, Chicago, Ill.
Knowlton, M. D. Co., Rochester, N. Y.
 Scandia Mfg. Co., No. Arlington, N. J.
 Stanely Works, The, New Britain, Conn.

MACHINES, BOTTLE CLEANING (Air)

Kiefer, Karl Machine Co., Cincinnati, Ohio
Pneumatic Scale Corp., Ltd., North Quincy, Mass.
 U. S. Bottlers Machinery Co., Chicago, Ill.

MACHINES, BOTTLE CLEANING (Washing)

Kiefer, Karl Machine Co., Cincinnati, Ohio
 Liquid Carbonic Corp., The, Chicago, Ill.
 U. S. Bottlers Machinery Co., Chicago, Ill.

MACHINES, BOX COLLAPSING

U. S. Automatic Box Machinery Co., Boston, Mass.

MACHINES, BOX MAKING (Set-Up)

Globe Mfg. Co., Phila., Pa.
Harris-Seybold-Potter Co., Dayton, Ohio
 Inman Mfg. Co., Inc., Amsterdam, N. Y.
Knowlton, M. D. Co., Rochester, N. Y.
 National Metal Edge Box Co., Phila., Pa.
New Jersey Machine Corp., Hoboken, N. J.
Stokes & Smith Co., Phila., Pa.

MACHINES, BOX WINDOW APPLYING

International Paper Box Machine Co., Nashua, N. H.

New Jersey Machine Corp., Hoboken, N. J.
 Smithe, F. L. Machine Co., Inc., New York,
 N. Y.
 Staude, E. G. Mfg. Co., St. Paul, Minn.
 Stokes & Smith Co., Phila., Pa.

MACHINES, BUNDLE TYING *(String)*

Bunn, B. H. Co., Chicago, Ill.
 Globe Mfg. Co., Phila., Pa.
 Potdevin Machine Co., Bklyn, N. Y.

MACHINES, BUNDLE TYING *(Wire Strapping)*

See Banding & Wire Strapping

MACHINES, BUNDLE WRAPPING

Amsco Packaging Machinery, Inc., Long
 Island City, N. Y.
 Battle Creek Bread Wrapping Machine
 Co., Battle Creek, Mich.
 Hayssen Mfg. Co., Sheboygan, Wis.
 Hudson-Sharp Machine Co., Green Bay,
 Wis.
 Johnson Automatic Sealer Co., Ltd., Battle
 Creek, Mich.
 Miller Wrapping & Sealing Machine Co.,
 Chicago, Ill.
 Package Machinery Co., Springfield, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Richard Machine Co., Battle Creek, Mich.

MACHINES, CAN CAPPING

Consolidated Packaging Machinery Corp.,
 Buffalo, N. Y.
 Crown Cork & Seal Co., The, Baltimore,
 Md.
 Ferguson, J. L. Co., Joliet, Ind.
 Food Machinery Corp., Sprague-Sells Div.,
 Hoopeston, Ill.
 Kiefer, Karl Machine Co., The, Cincinnati,
 Ohio
 Liquid Carbonic Corp., The, Chicago, Ill.
 Pneumatic Scale Corp., Ltd., North Quincy,
 Mass.
 Stokes & Smith Co., Phila., Pa.
 U. S. Bottlers Machinery Co., Chicago, Ill.
 Williams Sealing Corp., Decatur, Ill.

MACHINES, CAN CLOSING & SEALING

American Can Co., New York, N. Y.
 Ams, Max Machine Co., The, Bridgeport,
 Conn.
 Continental Can Co., New York, N. Y.
 Crown Can Co., Phila., Pa.
 Heekin Can Co., Cincinnati, Ohio
 Kiefer, Karl Machine Co., The, Cincinnati,
 Ohio
 National Can Corp., New York, N. Y.
 Pneumatic Scale Corp., Ltd., North Quincy,
 Mass.

MACHINES, CAN FILLING, DRY

See Machines, Filling, Dry

MACHINES, CAN FILLING, LIQUID

Alsop Engineering Corp., New York, N. Y.
 Crown Cork & Seal Co., The, Baltimore, Md.
 Ertel Engineering Corp., Kingston, N. Y.
 Food Machinery Corp., Sprague-Sells Div.,
 Hoopeston, Ill.
 Horix Manufacturing Co., Pittsburgh, Pa.
 Kiefer, Karl Machine Co., The, Cincinnati,
 Ohio
 Liquid Carbonic Corp., The, Chicago, Ill.
 Mosonni Bros. Co., Chicago, Ill.
 Scientific Filter Co., New York, N. Y.
 Stokes, F. J., Machine Co., Phila., Pa.
 U. S. Bottlers Machinery Co., Chicago, Ill.
 Vol-U-Meter Co., The, Buffalo, N. Y.

MACHINES, CAN LABELING

Burt Machine Co., Baltimore, Md.
 Ferguson, J. L. Co., Joliet, Ill.
 Food Machinery Corp., Sprague-Sells Div.,
 Hoopeston, Ill.
 Knowlton, M. D. Co., Rochester, N. Y.
 Liquid Carbonic Corp., The, Chicago, Ill.
 New Jersey Machine Corp., Hoboken, N. J.
 Pneumatic Scale Corp., Ltd., North Quincy,
 Mass.
 Standard-Knapp Corp., Portland, Conn.

MACHINES, CAN WRAPPING

Burt Machine Co., Baltimore, Md.
 Ferguson, J. L. Co., Joliet, Ill.
 Miller Wrapping & Sealing Machine Co.,
 Chicago, Ill.
 Package Machinery Co., Springfield, Mass.
 Redington, F. B. Co., Chicago, Ill.
 Standard-Knapp Corp., Portland, Conn.

MACHINES, CAP & COVER LINING

Ams, Max Machine Co., Bridgeport, Conn.
 Dewey & Almy Chemical Co., Cambridge
 B, Mass.

MACHINES, CAPPING

Aluminum Co. of America, Pittsburgh, Pa.
 Aluminum Steel Co., New Kensington, Pa.
 Anchor Hocking Glass Corp., Lancaster,
 Ohio
 Aridor Co., The, Chicago, Ill.
 Consolidated Packaging Machinery Corp.,
 Buffalo, N. Y.
 Crown Can Co., Phila., Pa.
 Crown Cork & Seal Co., The, Baltimore, Md.
 Ferguson, J. L. Co., Joliet, Ill.
 Goat, Fred Co., Inc., The, Bklyn, N. Y.
 Heekin Can Co., Cincinnati, Ohio
 Horix Mfg. Co., Pittsburgh, Pa.
 Kiefer, Karl Machine Co., The, Cincinnati,
 Ohio
 Liquid Carbonic Corp., The, Chicago, Ill.
 Pneumatic Scale Corp., Ltd., North Quincy,
 Mass.
 Resina Automatic Machy. Co., Inc., Bklyn,
 N. Y.
 Scientific Filter Co., New York, N. Y.
 U. S. Bottlers Machinery Co., Chicago, Ill.
 Williams Sealing Corp., Decatur, Ill.

MACHINES, CAPSULE WRAPPING

Ivers-Lee Co., Newark, N. J.
 New Jersey Machine Corp., Hoboken, N. J.

MACHINES, CARTON FORMING, LINING, FILLING, FOLDING, CLOSING

Battle Creek Bread Wrapping Machine Co.,
 Battle Creek, Mich.
 Bostitch, Inc., East Greenwich, R. I.
 Container Equipment Corp., Newark, N. J.
 Ferguson, J. L. Co., Joliet, Ill.
 Horix Mfg. Co., Pittsburgh, Pa.
 National Metal Edge Box Co., Phila., Pa.
 Pack-Rite Machines, Milwaukee, Wis.
 Peters Machinery Co., Chicago, Ill.
 Pneumatic Scale Corp., Ltd., North Quincy,
 Mass.
 Redington, F. B. Co., Chicago, Ill.
 Stokes & Smith Co., Phila., Pa.
 Triangle Package Machinery Co., Chicago,
 Ill.
 U. S. Automatic Box Machinery Co., Inc.,
 Boston, Mass.

MACHINES, CARTON LOADING

Burt Machine Co., Baltimore, Md.
 Container Equipment Corp., Newark, N. J.
 Ferguson, J. L. Co., Joliet, Ill.
 Goat, Fred Co., Inc., The, Bklyn, N. Y.

Jeffrey Mfg. Co., The, Columbus, Ohio
 Jones, R. A. Co., Covington, Ky.
 Redington, F. B. Co., Chicago, Ill.
 Stokes & Smith Co., Phila., Pa.
 U. S. Automatic Box Machinery Co., Inc.,
 Boston, Mass.

MACHINES, CASE LOADING

Burt Machine Co., Baltimore, Md.
 Container Equipment Corp., Newark, N. J.
 Crown Cork & Seal Co., Baltimore, Md.
 Ferguson, J. L. Co., Joliet, Ill.
 Standard-Knapp Corp., Portland, Conn.

MACHINES, CASE PRINTING

Ferguson, J. L. Co., Joliet, Ill.
 Hooper, F. X. Co., Inc., Glenarm, Md.
 Langston, Samuel M. Co., Camden, N. J.
 Swift, G. W. Jr., Inc., Bordentown, N. J.

MACHINES, CASE SEALING *(Glue)*

Ferguson, J. L. Co., Joliet, Ill.
 Standard-Knapp Corp., Portland, Conn.

MACHINES, CASE SEALING *(Gummed Tape)*

Arenco Machine Co., Inc., New York, N. Y.
 Better Packages, Inc., Shelton, Conn.
 Gummed Tape & Devices Co., Bklyn, N. Y.
 Nashua Gummed & Coated Paper Co.,
 Nashua, N. H.
 Nashua Package Sealing Co., Inc., Nashua,
 N. H.
 Rexford Paper Co., Milwaukee, Wis.
 Seal, Inc., Shelton, Conn.

MACHINES, CASE SEALING *(Staples and Wire)*

Acme Staple Co., Camden, N. J.
 Acme Steel Co., Chicago, Ill.
 Bostitch, Inc., East Greenwich, R. I.
 Dexter Folder Co., New York, N. Y.
 Harris-Seybold-Potter Co., Dayton, Ohio
 Heller Co., The, Cleveland, Ohio
 Ideal Stitcher & Mfg. Co., Racine, Wis.
 International Staple & Machine Co., Clifton
 Heights, Pa.
 Saranac Machine Co., Benton Harbor,
 Mich.

MACHINES, CELLULOSE TUBE MAKING

Amsco Packaging Machinery, Inc., Long
 Island City, N. Y.
 Hudson-Sharp Machine Co., Green Bay,
 Wis.
 Knowlton, M. D. Co., Rochester, N. Y.
 Miller Wrapping & Sealing Machine Co.,
 Chicago, Ill.
 Potdevin Machine Co., Bklyn, N. Y.
 Stokes & Smith Co., Phila., Pa.

MACHINES, CIRCULAR INSERTING

U. S. Automatic Box Machinery Co., Inc.,
 Boston, Mass.
 Weigh Right Automatic Scale Co., Joliet,
 Ill.

MACHINES, COATING *(Lacquer and Varnish)*

Haida Engineering Co., Long Island City,
 N. Y.
 Hudson-Sharp Machine Co., Green Bay,
 Wis.
 Knowlton, M. D. Co., Rochester, N. Y.
 Marconetti, A. E. Inc., New York, N. Y.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Corp., East Bos-
 ton, Mass.

Rutherford Machinery Co., Div. General
Printing Ink Corp., New York, N. Y.
Waldron, John Corp., New Brunswick, N. J.

MACHINES, COATING WAX

Container Equipment Corp., Newark, N. J.
Gellman Mfg. Co., Rock Island, Ill.
Hudson-Sharp Machine Co., Green Bay,
Wis.

International Paper Box Machine Co., The,
Nashua, N. H.
Knowlton, M. D. Co., Rochester, N. Y.
Potdevin Machine Co., Bklyn, N. Y.
Richard Machine Co., Battle Creek, Mich.
Rotogravure Engineering Co., East Boston,
Mass.

Standard-Knapp Corp., Portland, Conn.
Waldron, John Corp., New Brunswick, N. J.

MACHINES, COLLAPSIBLE TUBE (Filling & Sealing)

Areco Machine Co., Inc., New York, N. Y.
Colton, Arthur Co., Detroit, Mich.
Kiefer, Karl Machine Co., Cincinnati, Ohio
Stokes, F. J. Machine Co., Phila., Pa.

MACHINES, COLLAPSIBLE TUBE (Labeling)

Burt Machine Co., Baltimore, Md.
Liquid Carbonic Corp., Chicago, Ill.
Knowlton, M. D. Co., Rochester, N. Y.
Markem Machine Co., Keene, N. H.

MACHINES, CONVEYING

See Conveyors

MACHINES, CORKING

Ermold, Edward Co., New York, N. Y.
Horix Mfg. Co., Pittsburgh, Pa.
Kiefer, Karl Machine Co., Cincinnati, Ohio
Pneumatic Scale Corp., Ltd., North Quincy,
Mass.
Resina Automatic Machinery Co., Inc.,
Bklyn, N. Y.
U. S. Bottlers Machinery Co., Chicago, Ill.

MACHINES, COTTON INSERTING

Consolidated Packaging Machinery Corp.,
Buffalo, N. Y.
Lakso Company, The, Fitchburg, Mass.
New Jersey Machine Corp., Hoboken, N. J.

MACHINES, COUNTING

Colton, Arthur Co., Detroit, Mich.
Ferguson, J. L. Co., Joliet, Ill.
Redington, F. B. Co., Chicago, Ill.
Triangle Package Machinery Co., Chicago,
Ill.
Veeder-Root, Inc., Hartford, Conn.

MACHINES, CRIMPING COLLAPSIBLE TUBE

Areco Machine Co., Inc., New York, N. Y.
Colton, Arthur Co., Detroit, Mich.
Pack-Rite Machine Corp., Milwaukee, Wis.
Stokes, F. J. Machine Co., Phila., Pa.

MACHINES, CRIMPING & SEALING (Heat Sealing Materials)

Amsco Packaging Machinery, Inc., Long
Island City, N. Y.
Cleveland Crimping Press Co., Cleveland,
Ohio
Food Packaging Div. of Milprint, Inc., Mil-
waukee, Wis.
Gump, B. F. Co., Chicago, Ill.
Heat Seal-It Co., Phila., Pa.
Ivers-Lee Co., Newark, N. J.

Miller Wrapping & Sealing Machine Co.,
Chicago, Ill.
Pack-Rite Machines, Milwaukee, Wis.
Potdevin Machine Co., Bklyn, N. Y.
Stokes, F. J. Machine Co., Phila., Pa.
Stokes & Smith Co., Phila., Pa.
Waldron, John Corp., New Brunswick, N. J.
Wells Mfg. Co., San Francisco, Calif.
Wrap-Ade Machine Co., Inc., Newark, N. J.

MACHINES, CRIMPING, SEAMING FIBRE CANS

Ams, Max Machine Co., Bridgeport, Conn.
Knowlton, M. D. Co., Rochester, N. Y.
Paslode Co., Chicago, Ill.

MACHINES, DIE CUTTING

Champlain Div., Interchemical Corp., New
York, N. Y.
Globe Mfg., Phila., Pa.
Goat, Fred Co., Inc., The, Bklyn, N. Y.
Harris-Seybold-Potter Co., Dayton, Ohio
Hulbert Engineering Corp., Watertown,
Wis.
Potdevin Machine Co., Bklyn, N. Y.
Smith & Winchester Mfg. Co., S. Windham,
Conn.

MACHINES, DOMING (Boxes)

Beck, Charles Machine Co., Phila., Pa.
Globe Mfg. Co., Phila., Pa.
Hulbert Engineering Corp., Watertown,
Wis.
Knowlton, M. D. Co., Rochester, N. Y.
New Jersey Machine Corp., Hoboken, N. J.

MACHINES, EMBOSSING

Hudson-Sharp Machine Co., Green Bay,
Wis.
Knowlton, M. D. Co., Rochester, N. Y.
Marconetti, A. E. Inc., New York, N. Y.
Paper Converting Machine Co., Green Bay,
Wis.
Rutherford Machinery Co., Div. of General
Printing Ink Corp., New York, N. Y.
Waldron, John Corp., New Brunswick, N. J.

MACHINES, FIBRE CAN MAKING

Ferguson, J. L. Co., Joliet, Ill.
Hudson-Sharp Machine Co., Green Bay,
Wis.
Hulbert Engineering Corp., Watertown,
Wis.
Knowlton, M. D. Co., Rochester, N. Y.
Langston, Samuel M. Co., Camden, N. J.

MACHINES, FILLING, DRY (Gross and Net Weight)

Amsco Packaging Machinery, Inc., Long
Island City, N. Y.
Areco Machine Co., Inc., New York, N. Y.
Automatic Scale Co., Inc., New York, N. Y.
Battle Creek Bread Wrapping Machine Co.,
Battle Creek, Mich.
Consolidated Packaging Machinery Corp.,
Buffalo, N. Y.
Exact Weight Scale Co., The, Columbus,
Ohio
Ferguson, J. L. Co., Joliet, Ill.
Goat, Fred Co., Inc., The, Bklyn, N. Y.
Gump, B. F. Co., Chicago, Ill.
Miller Wrapping and Sealing Machine Co.,
Chicago, Ill.
Pneumatic Scale Corp., Ltd., North Quincy,
Mass.
Richard Machine Co., Battle Creek, Mich.
St. Regis Paper Co., New York, N. Y.
Stokes, F. J. Machine Co., Phila., Pa.
Stokes & Smith Co., Phila., Pa.
Syntron Co., Homer City, Pa.
Toledo Scale Co., Toledo, Ohio

Triangle Package Machinery Co., Chicago,
Ill.
U. S. Automatic Box Machinery Co., Inc.,
Boston, Mass.

MACHINES, FILLING, DRY (Volumetric)

Amsco Packaging Machinery, Inc., Long
Island City, N. Y.
Areco Machine Co., Inc., New York, N. Y.
Automatic Scale Co., Inc., New York, N. Y.
Battle Creek Bread Wrapping Machine Co.,
Battle Creek, Mich.
Brown Bag Filling Machine Co., The, Fitch-
burg, Mass.
Consolidated Packaging Machinery Corp.,
Buffalo, N. Y.
Ferguson, J. L. Co., Joliet, Ill.
Goat, Fred Co., Inc., The, Bklyn, N. Y.
Ivers-Lee Co., Newark, N. J.
Mojonnier Bros. Co., Chicago, Ill.
Peerless Products Mfg. Co., Detroit, Mich.
Pneumatic Scale Corp., Ltd., North Quincy,
Mass.
Stokes, F. J. Machine Co., Phila., Pa.
Stokes & Smith Co., Phila., Pa.
Syntron Co., Homer City, Pa.
Triangle Package Machinery Co., Chicago,
Ill.
U. S. Automatic Box Machinery Co., Inc.,
Boston, Mass.
Wright's Automatic Machinery Co., Dur-
ham, N. C.

MACHINES, FILLING, LIQUID (Automatic and Semi-Automatic)

Alsop Engineering Corp., Milldale, Conn.
Areco Machine Co., Inc., New York, N. Y.
Colton, Arthur Co., Detroit, Mich.
Crown Cork & Seal Co., The, Baltimore, Md.
Food Machinery Corp., Sprague-Sells Div.,
Hoopeston, Ill.
Horix Manufacturing Co., Pittsburgh, Pa.
Kiefer, Karl Machine Co., The, Cincinnati,
Ohio
Liquid Carbonic Corp., The, Chicago, Ill.
Mojonnier Bros. Co., Chicago, Ill.
Pneumatic Scale Corp., Ltd., North Quincy,
Mass.
Scientific Filter Co., New York, N. Y.
U. S. Bottlers Machinery Co., Chicago, Ill.
Vol-U-Meter Co., The, Buffalo, N. Y.

MACHINES, FILLING, SEMI-LIQUID (Viscose)

Areco Machine Co., Inc., New York, N. Y.
Colton, Arthur Co., Detroit, Mich.
Crown Can Co., Phila., Pa.
Food Machinery Corp., Sprague-Sells Div.,
Hoopeston, Ill.
Horix Mfg. Co., Pittsburgh, Pa.
Kiefer, Karl Machine Co., The, Cincinnati,
Ohio
Mojonnier Bros. Co., Chicago, Ill.
Pneumatic Scale Corp., Ltd., North Quincy,
Mass.
Scientific Filter Co., New York, N. Y.
Stokes, F. J. Machine Co., Phila., Pa.
Stokes & Smith Co., Phila., Pa.
U. S. Bottlers Machinery Co., Chicago, Ill.
Vol-U-Meter Co., The, Buffalo, N. Y.

MACHINES, GUMMED TAPE

Better Packages, Inc., Shelton, Conn.
Ever Ready Label Corp., New York, N. Y.
Nashua Package Sealing Co., Inc., Nashua,
N. H.
U. S. Automatic Box Machinery Co., Inc.,
Boston, Mass.

MACHINES, LABELERS

Alsop Engineering Corp., Milldale, Conn.
Areco Machine Co., Inc., New York, N. Y.

Better Packages, Inc., Shelton, Conn.
 Burt Machine Co., Baltimore, Md.
 Designers for Industry, Inc., Cleveland, Ohio
 Economic Machinery Co., Worcester, Mass.
 Ermold, Edward Co., New York, N. Y.
 Ferguson, J. L. Co., Joliet, Ill.
 Food Machinery Corp., Sprague-Sells Div., Hoopeston, Ill.
 Gellman Mfg. Co., Rock Island, Ill.
 Globe Mfg. Co., Phila., Pa.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Haida Engineering Co., Long Island City, N. Y.
 Liquid Carbonic Corp., The, Chicago, Ill.
 New Jersey Machine Corp., Hoboken, N. J.
 Oliver Machinery Co., Grand Rapids, Mich.
 Package Machinery Co., Springfield, Mass.
 Pneumatic Scale Corp., Ltd., North Quincy, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Redington, F. B. Co., Chicago, Ill.
 Standard-Knapp Corp., Portland, Conn.
 Stokes & Smith Co., Phila., Pa.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, LAMINATING

Haida Engineering Co., Long Island City, N. Y.
 Henschel, C. B. Mfg. Co., Milwaukee, Wis.
 Hudson-Sharp Machine Co., Green Bay, Wis.
 Knowlton, M. D. Co., Rochester, N. Y.
 Marconetti, A. E. Inc., New York, N. Y.
 Meisel Press Mfg. Co., Boston, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Corp., East Boston, Mass.
 Waldron, John Corp., New Brunswick, N. J.

MACHINES, MARKING (Box & Carton)

Ferguson, J. L. Co., Joliet, Ill.
 Force, Wm. A. & Co., Inc., Bklyn, N. Y.
 Marconetti, A. E. Inc., New York, N. Y.
 Markem Machine Co., Keene, N. H.
 Peerless Roll Leaf Co., Inc., Union City, N. J.

MACHINES, METAL EDGE STAYING

National Metal Edge Box Co., Phila., Pa.

MACHINES, MILK BOTTLE HOODING

Aluminum Co. of America, Pittsburgh, Pa.
 Aluminum Seal Co., New Kensington, Pa.
 Crown Cork & Seal Co., The, Baltimore, Md.
 Package Machinery Co., Springfield, Mass.
 Sealright Co., Inc., Fulton, N. Y.

MACHINES, NUMBERING, PRINTING OR PERFORATING

American Perforator Co., The, Chicago, Ill.
 Bates Mfg. Co., The New York, N. Y.
 Force, Wm. A. & Co., Inc., Bklyn, N. Y.
 Harris-Seybold-Potter Co., Dayton, Ohio
 Markem Machine Co., Keene, N. H.
 Meisel Press Mfg. Co., Boston, Mass.
 New Jersey Machine Corp., Hoboken, N. J.
 Oliver Machinery Co., Grand Rapids, Mich.
 Potdevin Machine Co., Bklyn, N. Y.

MACHINES, PACKET FILLING

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
 Arenco Machine Co., Inc., New York, N. Y.
 Automatic Scale Co., Inc., New York, N. Y.
 Brown Bag Filling Machine Co., The, Fitchburg, Mass.

Consolidated Packaging Machinery Corp., Buffalo, N. Y.
 Ferguson, J. L. Co., Joliet, Ill.
 Gump, B. F. Co., Chicago, Ill.
 Hulbert Engineering Corp., Watertown, Wis.
 Redington, F. B. Co., Chicago, Ill.
 Stokes & Smith Co., Phila., Pa.
 Triangle Package Machy., Co., Chicago, Ill.
 U. S. Automatic Box Machinery Co. Inc., Boston, Mass.
 Weigh Right Automatic Scale Co., Joliet, Ill.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, PAPER BAG FEEDING, OPENING, WEIGHING & CLOSING (Automatic)

Amsco Packaging Machinery Co., Long Island City, N. Y.
 Arenco Machine Co., Inc., New York, N. Y.
 Bemis Bro. Bag Co., St. Louis, Mo.
 Betner, Benj. C. Co., Devon, Pa.
 Cleveland Crimping Press Co., Cleveland, Ohio
 Consolidated Packaging Machine Co., Buffalo, N. Y.
 Gump, B. F. Co., Chicago, Ill.
 Redington, F. B. Co., Chicago, Ill.
 Stokes & Smith Co., Phila., Pa.
 St. Regis Paper Co., New York, N. Y.
 U. S. Automatic Box Machinery Co., Inc., Boston, Mass.
 Weigh Right Automatic Scale Co., Joliet, Ill.

MACHINES, PAPER ROLL FEEDING

Cameron Machine Co., Brooklyn, N. Y.
 Champlain Div., Interchemical Corp., New York, N. Y.
 Hudson-Sharp Machine Co., Green Bay, Wis.
 Marconetti, A. E. Inc., New York, N. Y.
 Modern Equipment Corp., Defiance, Ohio
 Paper Converting Machine Co., Green Bay, Wis.
 Rotogravure Engineering Co., E. Boston, Mass.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, PAPER SHREDDING

Industrial Shredder & Cutter Co., Salem, Ohio

MACHINES, PARTITION ASSEMBLING

Hooper, F. X. Co., Inc., Glenarm, Md.
 Inman Mfg. Co., Inc., Amsterdam, N. Y.
 Standard-Knapp Corp., Portland, Conn.

MACHINES, PREFORMING & TABLETTING

Colton, Arthur Co., Detroit, Mich.
 Stokes, F. J. Machine Co., Phila., Pa.

MACHINES, REVENUE STAMP

Arenco Machine Co., Inc., New York, N. Y.
 New Jersey Machine Corp., Hoboken, N. J.
 Package Machinery Co., Springfield, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Redington, F. B. Co., Chicago, Ill.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, RIGID TRANSPARENT FABRICATING

Able Machine & Tool Works, New York, N. Y.
 Camford Machine Corp., New York, N. Y.

Globe Mfg. Co., Phila., Pa.
 Hulbert Engineering Corp., Watertown, Wis.
 Knowlton, M. D. Co., Rochester, N. Y.
 National Metal Edge Box Co., Phila., Pa.
 Taber Instrument Corp., N. Tonawanda, N. Y.

MACHINES, ROLL LEAF STAMPING

Couglin Mfg. Co., New York, N. Y.
 Griffin, Campbell, Hayes, Walsh, Inc., New York, N. Y.
 Markem Machine Co., Keene, N. H.
 Peerless Roll Leaf Co., Inc., Union City, N. J.

MACHINES, ROLL SLITTERS & REWINDERS

Beck, Chas. Machine Co., Phila., Pa.
 Cameron Machine Co., Bklyn, N. Y.
 Champlain Div., Interchemical Corp., New York, N. Y.
 Globe Mfg. Co., Phila., Pa.
 Hudson-Sharp Machine Co., Green Bay, Wis.
 Kidder Press Co., Inc., Dover, N. H.
 Knowlton, M. D. Co., Rochester, N. Y.
 Langston, Samuel M. Co., Camden, N. J.
 Meisel Press Mfg. Co., Boston, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Corp., E. Boston, Mass.
 Waldron, John Corp., New Brunswick, N. J.

MACHINES, SHEET FEEDING

Hudson-Sharp Machine Co., Green Bay, Wis.
 Marconetti, A. E. Inc., New York, N. Y.
 Wright's Automatic Machinery Co., Durham, N. C.

MACHINES, SHEETING

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
 Beck, Chas. Machine Co., Phila., Pa.
 Champlain Div., Interchemical Corp., New York, N. Y.
 Globe Mfg. Co., Phila., Pa.
 Hudson-Sharp Machine Co., Green Bay, Wis.
 Kidder Press Co., Inc., Dover, N. H.
 Knowlton, M. D. Co., Rochester, N. Y.
 Meisel Press Mfg. Co., Boston, Mass.
 Miller Wrapping & Sealing Machine Co., Chicago, Ill.
 Oliver Machinery Co., Grand Rapids, Mich.
 Peters Machinery Co., Chicago, Ill.
 Potdevin Machine Co., Bklyn, N. Y.
 Wrap-Ade Machine Co., Inc., Newark, N. J.

MACHINES, SPIRAL WRAPPING

Ferguson, J. L. Co., Joliet, Ill.
 Knowlton, M. D. Co., Rochester, N. Y.
 Langston, Samuel A. Co., Camden, N. J.
 Paper Converting Machine Co., Green Bay, Wis.
 Terkelsen Machine Co., Boston, Mass.

MACHINES, STATIC ELIMINATING

Kidder Press Co., Inc., Dover, N. H.
 Potdevin Machine Co., Bklyn, N. Y.
 Simco Co., The, Phila., Pa.

MACHINES, STENCIL CUTTING

Bradley, A. J. Mfg. Co., Long Island City, N. Y.
 Diagraph-Bradley Stencil Machine Corp., St. Louis, Mo.
 Ideal Stencil Machine Co., Racine, Wis.
 Knowlton, M. D. Co., Rochester, N. Y.
 Marsh Stencil Machine Co., Belleville, Ill.

Addresses of companies listed appear on pages 622-630

MACHINES, STRIP COMBINING
(For Window Bags & Wrappers)

Cameron Machine Co., Bklyn, N. Y.

MACHINES, TABLET COUNTING & PACKAGING

Arenco Machine Co., Inc., New York, N. Y.
Colton, Arthur Co., Detroit, Mich.
Ivers-Lee Co., Newark, N. J.
Redington, F. B. Co., Chicago, Ill.
Stokes, F. J. Machine Co., Phila., Pa.
Stokes & Smith Co., Phila., Pa.
Triangle Package Machinery Co., Chicago, Ill.
U. S. Automatic Box Machinery Co., Inc., Boston, Mass.

MACHINES, TIGHT WRAPPING
(For Carton Shells)

Pneumatic Scale Corp., Ltd., North Quincy, Mass.
Stokes & Smith Co., Phila., Pa.

MACHINES, TUBE LACQUERING, VARNISHING & PRINTING

Hudson-Sharp Machine Co., Green Bay, Wis.
Rutherford Machinery Co., Div. Gen. Printing Ink Corp., New York, N. Y.

MACHINES, UNSCRAMBLING

Burt Machine Co., Baltimore, Md.
Food Machinery Corp., Sprague-Sells Div., Hoopeston, Ill.
Horix Mfg. Co., Pittsburgh, Pa.
New Jersey Machine Corp., Hoboken, N. J.
Standard-Knapp Corp., Portland, Conn.

MACHINES, WEIGHING

See Scales

MACHINES, WIRE STAPLING

Acme Stable Co., Camden, N. J.
Acme Steel Co., Chicago, Ill.
Bates Mfg. Co., The, New York, N. Y.
Bostitch, Inc., East Greenwich, R. I.
Globe Mfg. Co., Phila., Pa.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
Ideal Stitcher & Mfg. Co., Racine, Wis.
Inland Container Corp., Indianapolis, Ind.
Knowlton, M. D. Co., Rochester, N. Y.
Paslode Co., Chicago, Ill.
Saranac Machine Co., Benton Harbor, Mich.

MACHINES, WIRE STITCHING

Acme Steel Co., Chicago, Ill.
Bostitch, Inc., East Greenwich, R. I.
Dexter Folder Co., Pearl River, N. Y.
Globe Mfg. Co., Phila., Pa.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
Ideal Stitcher & Mfg. Co., Racine, Wis.
Knowlton, M. D. Co., Rochester, N. Y.
Paslode Co., Chicago, Ill.
Saranac Machine Co., Benton Harbor, Mich.

MACHINES, WRAPPING

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
Arenco Machine Co., Inc., New York, N. Y.
Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.
Gellman Mfg. Co., Rock Island, Ill.
Globe Mfg. Co., Phila., Pa.
Hayssen Mfg. Co., Sheboygan, Wis.
Hudson-Sharp Machine Co., Green Bay, Wis.

Ivers-Lee Co., Newark, N. J.
Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Modern Equipment Corp., Defiance, Ohio
National Bread Wrapping Machine Co., Springfield, Mass.
Oliver Machinery Co., Grand Rapids, Mich.
Package Machinery Co., Springfield, Mass.
Redington, F. B. Co., Chicago, Ill.
Richard Machine Co., Battle Creek, Mich.
Scandia Mfg. Co., N. Arlington, N. J.
Stokes & Smith Co., Philadelphia, Pa.
Terkelsen Machine Co., Boston, Mass.
U. S. Automatic Box Machinery Co., Inc., Boston, Mass.

MOLDERS, PLASTIC

Ability Mold & Die Works, Chicago, Ill.
Accessories Mfg. Co., Kansas City, Mo.
Accurate Molding Corp., Bklyn, N. Y.
Ackerman Plastic Molding, Cleveland, Ohio
Acraglas Co., The, Santa Monica, Calif.
Adler Engineering Co., Hackettstown, N. J.
Advance Molding Corp., New York, N. Y.
Alden Prods. Co., Brockton, Mass.
All American Aircraft Prods., Inc., Long Beach, Calif.
Allied Barrel Corp., Oil City, Pa.
Allied Plastics Co., Los Angeles, Calif.
American Denture Corp., Portland, Ore.
American Insulator Corp., New Freedom, Pa.
American Molded Products Co., Chicago, Ill.
American Molding Co., San Francisco, Calif.
Amos-Thompson Corp., Edinburgh, Ind.
Armstrong Cork Co., Lancaster, Pa.
Arpin Prods., Inc., Orange, N. J.
Arrow Plastics Corp., Passaic, N. J.
Artisan Plastic Moulding Co., Trenton, N. J.
Atlantic Plastic & Metal Parts Co., Cleveland, Ohio
Atlantic Plastics, Inc., Woodside, N. Y.
Atlas Appliance Corp., Bklyn, N. Y.
Atlas Plastic Mfg. Co., Inc., Lynbrook, L. I., N. Y.
Auburn Button Works, Inc., Auburn, N. Y.
Automatic Plastic Prods., Emeryville, Calif.
Bachmann Bros., Inc., Phila., Pa.
Baker, Willoughby, Oakland, Calif.
Barber Colman Co., Molded Prods. Div., Rockford, Ill.
Barnes Plastic Co., Los Angeles, Calif.
Bay State Moulding Co., Boston, Mass.
Beaman Molded Prods. Co., Portland, Ore.
Bergwood Molding Co., Kansas City, Mo.
Berkander, Geo. F. Inc., Providence, R. I.
Bolta Co., The, Lawrence, Mass.
Boonton Molding Co., Boonton, N. J.
Breyer Molding Co., Chicago, Ill.
Bridgeport Moulded Prods., Inc., Bridgeport, Conn.
Brill-Monfort Co., Inc., Bklyn, N. Y.
Brogan, Byard F., Phila., Pa.
Bryant Electric Co., Bridgeport, Conn.
Burton Mfg. Co., Chicago, Ill.
Butterfield, T. F. Inc., Naugatuck, Conn.
Button Corp. of America, Newark, N. J.
Caldwell Prods., Inc., New York, N. Y.
California Pacific Plastic Co., Los Angeles, Calif.
California Plastic Moulding Co., Los Angeles, Calif.
California Plastics Co., San Francisco, Calif.
Capac Mfg. Co., Capac, Mich.
Cardinal Corp., The, Evansville, Ind.
Celluplastic Corp., Newark, N. J.
Central Die Casting & Mfg. Co., Chicago, Ill.
Central Machine Works Co., Minneapolis, Minn.
Chicago Die Mold Mfg. Co., Chicago, Ill.
Chicago Molded Products Corp., Chicago, Ill.
Chicago Plastic Mfg. Co., Chicago, Ill.
Cinch Mfg. Corp., Chicago, Ill.

Cincinnati Advertising Prods. Co., Cincinnati, Ohio
Cincinnati Molding Co., Cincinnati, Ohio
Claremould Plastics Co., Newark, N. J.
Cleveland Plastics, Inc., Cleveland, Ohio
Climax Mfg. & Molding Corp., Canton, Ohio
Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Columbia Protektosite Co., Inc., Carlstadt, N. J.
Columbus Plastic Products Co., Inc., Columbus, Ohio
Commonwealth Plastic Co., Leominster, Mass.
Compo-Site, Inc., Paterson, N. J.
Connecticut Hard Rubber Co., New Haven, Conn.
Connecticut Plastic Prods. Co., Waterbury, Conn.
Consolidated Molded Products Corp., Scranton, Pa.
Continental Plastics Corp., Chicago, Ill.
Craven-Whittaker Co., Providence, R. I.
Cruver Mfg. Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
D & W Tool Co., Glendale, Cal.
Davies, Harry Molding Co., Chicago, Ill.
Dayton Insulating Molding Co., Dayton, Ohio
Designs, Inc., North Bergen, N. J.
Detroit Macoid Corp., Detroit, Mich.
Diemolding Corp., Canastota, N. Y.
Dillon-Beck Mfg. Co., Irvington, N. J.
Drell Novelty Mfg. Co., New York, N. Y.
Eagle Plastics Corp., Long Island City, N. Y.
Eastern Plastics Prods., Corp., Pittsburgh, Pa.
Eby, Hugh H. Inc., Phila., Pa.
Eclipse Moulded Products Co., Milwaukee, Wis.
Economy Fuse & Mfg. Co., Chicago, Ill.
Electric Auto-Lite Co., Bay Mfg. Div., Bay City, Mich.
Emeloid Co., Inc., Arlington, N. J.
Erie Plastics Co., Erie, Pa.
Erie Resistor Corp., Erie, Pa.
Essex Corp., Charlottesville, Va.
Eureka Button Co., New York, N. Y.
Firestone Rubber & Latex Products Co., Fall River, Mass.
Foster-Grant Co., Inc., Leominster, Mass.
Franklin Plastics Div., Robinson Industries, Inc., Franklin, Pa.
Gardner Taubes Corp., New York, N. Y.
Garfield Mfg. Co., Garfield, N. J.
Gemloid Corp., Elmhurst, L. I., N. Y.
General Electric Co., Plastics Dept., Pittsfield, Mass.
General Industries Co., Elyria, Ohio
General Insulate Co., Inc., Bklyn, N. Y.
General Molded Prods., Inc., Des Plaines, Ill.
General Molding Co., Rockledge, Pa.
General Prods., Corp., Union Springs, N. Y.
Gesler Jewelry Co., Providence, R. I.
Gibbs Mfg., Berkeley, Calif.
Gits Molding Corp., Chicago, Ill.
Globe Tool & Molded Prods. Co., Rockford, Ill.
Golden Gate Mfg. Co., Oakland, Calif.
Grammes, L. F. & Sons, Inc., Allentown, Pa.
Great American Plastics Co., Leominster, Mass.
Grigoleit Co., The, Decatur, Ill.
Grimes Mfg. Co., Urbana, Ohio
Grotelite Co., Inc., The, Bellevue, Ky.
Guilliksen, W. M. Mfg. Co., Newton Lower Falls, Mass.
Haas Corp., The, Mendon, Mich.
Hodgman Rubber Co., Framingham, Mass.
Hyde, A. L. Co., Grenloch, N. J.
Ideal Novelty & Toy Co., Long Island City, N. Y.
Illini Molded Plastics, Hinsdale, Ill.
Imperial Molded Products Corp., Chicago, Ill.
Industrial Molded Prods. Co., Chicago, Ill.

- Ingwersen Mfg. Co., Denver, Colo.
Injection Molding Co., Kansas City, Mo.
Injection Molding Corp., New York, N. Y.
Inland Mfg. Div., General Motors Corp., Dayton, Ohio
Insel Co., Arlington, N. J.
Instaset Plastics Div., Evans-Winter-Hebb, Inc., Detroit, Mich.
Insulation Mfg. Co., Inc., Bklyn, N. Y.
Insulation Prods. Co., Pittsburgh, Pa.
International Molded Plastics, Inc., Cleveland, Ohio
Jamison, H., Freeport, L. I., N. Y.
Kampa Mfg. Co., Milwaukee, Wis.
K. C. Plastic Fabricators, Kansas City, Mo.
Keasbey & Mattison, Ambler, Pa.
Keeler Brass Co., Grand Rapids, Mich.
Kellogg Switchboard & Supply Co., Chicago, Ill.
Keolyn Plastics Co., Chicago, Ill.
Keystone Specialty Co., Cleveland, Ohio
Kilgore Mfg. Co., The, (Plastics Div.), Westerville, Ohio
King Plastic Corp., Denver, Colo.
Kingman, E. B. Co., Leominster, Mass.
Kirk, F. J. Molding Co., Clinton, Mass.
Kling Bros. Eng. Works, Chicago, Ill.
Kuhn & Jacob Moulding & Tool Co., Trenton, N. J.
Kurz-Kasch, Inc., Dayton, Ohio
Lanfare Molded Prods., Toledo, Ohio
Lapin Prods., Inc., Newark, N. J.
Leviton Mfg. Co., Bklyn, N. Y.
Lindenhurst Mfg. Co., Inc., Lindenhurst, N. Y.
Mack Molding Co., Wayne, N. J.
Martindell Molding Co., Trenton, N. J.
Maryland Plastics, Inc., Federalburg, Md.
Mason, Thomas Co., Inc., The, Stamford, Conn.
Master Plastic Molding Corp., St. Louis, Mo.
Master Tool & Die Makers, New York, N. Y.
McDonald Mfg. Co., Los Angeles, Calif.
McInerney Plastics Co., Grand Rapids, Mich.
Mechanical Institute, Boonton, N. J.
Meissner Mfg. Co., Carmel, Ill.
Merrigan Plastic Co., Los Angeles, Calif.
Metal Specialty Co., The, Cincinnati, Ohio
Micamold Radio Corp., Bklyn, N. Y.
Michigan Molded Plastics, Inc., Dexter, Mich.
Mico, Inc., Millerton, N. Y.
Midwest Molding & Mfg. Co., Chicago, Ill.
Mill-O-Plast Co., New York, N. Y.
Mills, Elmer E. Corp., Chicago, Ill.
Minneapolis Plastic Co., Minneapolis, Minn.
Minnesota Plastics Corp., St. Paul, Minn.
Modern Machine Corp., Bklyn, N. Y.
Modern Plastic Co., Los Angeles, Calif.
Modern Plastics Corp., Benton Harbor, Mich.
Modglin Co., Los Angeles, Calif.
Molded Insulation Co., Phila., Pa.
Molded Prods. Co., Chicago, Ill.
Molding Corp. of America, Inc., Pawtucket, R. I.
Monoplastics, Inc., Georgetown, Conn.
Morrell, George Corp., Muskegon Heights, Mich.
National Lock Co., Rockford, Ill.
National Organ Supply Co., Erie, Pa.
National Plastics, Inc., Knoxville, Tenn.
New England Novelty Co., Leominster, Mass.
New Products Corp., Benton Harbor, Mich.
Niagara Insul-Bake Specialty Co., Inc., Albany, N. Y.
Northeastern Molding, Inc., Pawtucket, R. I.
Northeastern Plastics Corp., Boston, Mass.
Northern Industrial Chem. Co., So. Boston, Mass.
Northwest Plastics, Inc., St. Paul, Minn.
Norton Laboratories, Inc., Lockport, N. Y.
Ohio Plastic Co., The, Frazeyburg, Ohio
Oris Mfg. Co., Inc., Thomaston, Conn.
O'Shei, B. F., Buffalo, N. Y.
Owens-Illinois Glass Co., Toledo, Ohio
Paragon Plastics, Inc., Seattle, Wash.
Patent Button Co. of Tenn., The, Knoxville, Tenn.
Paulis, H. Plastic Co., Los Angeles, Calif.
Peerless Molded Plastics, Toledo, Ohio
Perfection Plastic Prods., East Newark, N. J.
Pittsburgh Plastics Co., New Kensington, Pa.
Place, Roland P. Co., Midland, Mich.
Plano Molding Co., Plano, Ill.
Plastal Specialties Co., Seattle, Wash.
Plas-Tex Corp., Los Angeles, Calif.
Plastic & Die Cast Prods. Corp., Los Angeles, Calif.
Plastic & Rubber Prods. Co., Los Angeles, Calif.
Plastic Co., Inc., Los Angeles, Calif.
Plastic Industries, Inc., Bedford, Ohio
Plastic Molded Arts, Inc., Long Island City, N. Y.
Plastic Molding Corp., Sandy Hook, Conn.
Plastic Moldings Corp., Cincinnati, Ohio
Plastic Products, Inc., Detroit, Mich.
Plastic Products, Inc., New York, N. Y.
Plastic Research Foundation, Brookline, Mass.
Plastic-Ware, Inc., New York, N. Y.
Plasticraft Associates, Chicago, Ill.
Plastics, Inc., St. Paul, Minn.
Plastics, Inc., Bradley Beach, N. J.
Plastics Engineering Co., Sheboygan, Wis.
Plastics Engineering, Inc., Cleveland, Ohio
Plastimold, Inc., Attleboro, Mass.
Poinsettia, Inc., Pitman, N. J.
Potter & Brumfield Mfg. Co., Inc., Princeton, Ind.
Precision Molded Plastics, Inc., Cleveland, Ohio
Precision Plastics Co., Phila., Pa.
Pro-phy-lac-tic Brush Co., Florence, Mass.
Pyro Plastics Co., The, Westfield, N. J.
Racine Universal Motor Co., Racine, Wis.
Rathbun Molding Corp., Salamanca, N. Y.
Raymond Laboratories, Inc., St. Paul, Minn.
Recto Molded Prods., Inc., Cincinnati, Ohio
Reinhold, F. E. Co., Los Angeles, Calif.
Remler Co., Ltd., San Francisco, Calif.
Resistoflex Corp., Belleville, N. J.
Reynolds Spring Co., Molded Plastics Div., Cambridge, Ohio
Richardson Co., The, Chicago, Ill.
Robinson-Spear Corp., New York, N. Y.
Rogan Bros., Chicago, Ill.
Rogers, V. F., Denver, Colo.
Royal Moulding Co., Providence, R. I.
Safe-ty Socket Co., Gibson City, Ill.
St. Louis Plastic Moulding Co., St. Louis, Mo.
Salz Bros., Inc., New York, N. Y.
Sav-Way Industries, Detroit, Mich.
Schwab & Frank, Inc., Detroit, Mich.
Scott, Geo. S. Mfg. Co., The, Plantsville, Conn.
Seder & Son Molded Prods. Co., Fort Collins, Colo.
Seymour's & Co., Chicago, Ill.
Shaw Insulator Co., Irvington, N. J.
Sheller Mfg. Corp., Portland, Ind.
Shepherd, J. H. Son & Co., Elyria, Ohio
Sinko Tool & Mfg. Co., Chicago, Ill.
Smith, Frank B. Molding Co., Chicago, Ill.
Sobenite, Inc., So. Bend, Ind.
Southern Plastics Co., Columbia, S. C.
Southwest Machine & Plastic Co., Los Angeles, Calif.
Specialty Insulation Mfg. Co., Inc., Hoosick Falls, N. Y.
Standard Cap & Molding Co., Inc., Baltimore, Md.
Standard Electric Mfg. Co., Chicago, Ill.
Standard Novelty Box Co., New York, N. Y.
Standard Plastics Co., Attleboro, Mass.
Standard Prods. Co., The, Thermo-Plastic Div., Detroit, Mich.
Sterling Plastics Co., Union, N. J.
Stokes, Jos. Rubber Co., Trenton, N. J.
Style Molders, Inc., Bklyn, N. Y.
Sulak Mfg. Co., Seattle, Wash.
Superior Plastic Co., Chicago, Ill.
Synthetic Moulded Prods., Inc., Wakefield, R. I.
Synthetic Plastics Co., Newark, N. J.
Tech-Art Plastics Co., Long Island City, N. Y.
Telex Prods. Co., Minneapolis, Minn.
Terkelsen Machine Co., Boston, Mass.
Ther Electric & Machine Works, Chicago, Ill.
Tight Closure Co., Milwaukee, Wis.
Tilton & Cook Co., Leominster, Mass.
Titan Plastic Prods. Co., Los Angeles, Calif.
Toledo Plastics Co., Toledo, Ohio
Trenton Metals & Plastics Co., Trenton, N. J.
Tri-State Plastic Molding Co., Henderson, Ky.
Tungsten Contact Mfg. Co., Inc., North Bergen, N. J.
Tupper Plastics, Farnumsville, Mass.
Uncas Mfg. Co., Providence, R. I.
Union Insulating Co., Parkersburg, W. Va.
United Comb & Novelty Co., Inc., Leominster, Mass.
United Plastics Corp., Cleveland, Ohio
Universal Button Fastening & Button Co., Detroit, Mich.
Universal Plastics Corp., New Brunswick, N. J.
Van Norman Molding Co., Chicago, Ill.
Victor Mfg. & Gasket Co., Chicago, Ill.
Victor Metal Products Corp., Bklyn, N. Y.
Victory Button Co., Inc., Leominster, Mass.
Vlcek Tool Co., The, Plastics Div., Cleveland, Ohio
Voges Mfg. Co., The, Ozone Park, L. I., N. Y.
Vulcanized Rubber Co., The, New York, N. Y.
Walco Plastics Co., E. Orange, N. J.
Ward Plastic & Rubber Co., Rochester, N. Y.
Warren Plastics Corp., Warren, Pa.
Washington Molding Co., Inc., Port Washington, N. Y.
Waterbury Button Co., Waterbury, Conn.
Watertown Mfg. Co., Watertown, Conn.
Western Plastics Moulding Co., Los Angeles, Calif.
Wheeling Stamping Co., Wheeling, W. Va.
White, S. S. Dental Mfg. Co., The, New York, N. Y.
Windman Bros., Los Angeles, Calif.
Wolford Plastic Molding Co., Los Angeles, Calif.
Worcester Moulded Plastics Co., Worcester, Mass.
Wright Plastics, Inc., New York, N. Y.
Yardley Plastics Co., Columbus, Ohio
Zenith Plastics, Inc., Cleveland, Ohio

OPENING TAPE

(For Cellophane Packages)

- Chicago Printed String Co., Chicago, Ill.
Dobeckmun Co., The, Cleveland, Ohio
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Fibre Cord Co., New York, N. Y.
Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
Shellmar Products Co., Mt. Vernon, Ohio
Sylvania Industrial Corp., New York, N. Y.

PACKAGE DESIGN CONSULTANTS (Independent Organizations)

California

- Cruze, Charles, Los Angeles
Wheeler, Leon A., Los Angeles

Connecticut

Cheron, Pierre I., Stratford
Hall, Frances Cushing, Westport
Post & Johnson, Inc., Hartford

Georgia

Grau, Russell, Atlanta

Illinois

Bielefield, Inc., Herbert, Chicago
Carter, Joseph, Chicago
Chirpe, W. Rodney, Chicago
Farrel, Harry H., Chicago
Jones, E. Willis, Chicago
Knoche, Lucille, Chicago
Koch, Karl Peter, Chicago
Ressinger, Paul, Chicago
Spuehler, Ernst A., Chicago
Thelander, Clement J., Chicago

Massachusetts

Baermann, Walter, Holyoke
Marsh, George, Boston

Michigan

Cooper, R. G., Detroit
Swibold, Duane, Royal Oak

Missouri

Ditch, Ruth M., St. Louis

New Jersey

Chipman, Richmond Lane Jr., Montclair

New York

Aids, Inc., New York City
Allen, Arthur S., New York City
Arens, Egmont, New York City
Bayer, Herbert, New York City
Bellisio, Bartolomeo, New York City
Bernhard, Lucian, New York City
Berni, Alan, New York City
Blumenthal, Margaret, New York City
Breen, Frederick Murray Inc., New York City
Clarke, Rene, New York City
Collura, Francesco, New York City
Colwell, Laurence J., New York City
Condon, Frank, New York City
D'Addario, Thomas, New York City
Davison, George, New York City
De Nina, James Andrew, New York City
Dunne, Liam, New York City
Frederico, Joseph B., Niagara Falls
Freeman, Edna Leslie, New York City
Gianninoto, Frank & Associates, New York City
Goldsborough, Francis F., New York City
Grover, Frederic S., Rochester
Haverlee, Arnold H., New York City
Hodges, Guy W. Inc., New York City
Horsung, Clarence P., New York City
Karasz, Ilonka, Brewster
Ketcham, Howard, New York City
Koodin Lapow Associates, New York City
Koster, Louis, H., New York City
Lewis, Ben, New York City
Lux, Eugene J., New York City
Martiall & Scull, New York City
Maurer, Sascha A., New York City
Mayer, Fred A., New York City
Murray & Scheiding, New York City
Nash, Ben Inc., New York City
Nickelson, John, Flushing
O'Neil, Wm., New York City
Phenix Associates, New York City
Scheele, Edwin H., New York City
Schusterman, Wm. V., Bronx
Tarpey, Thomas, Bronx
Ullman, Martin, New York City
Weeks, Wentworth, New York City
Welder, W. Archibald, New York City
Wilmet, Georges Inc., New York City
Woodbury, C. O., New York City

Ohio

Designers for Industry, Inc., Cleveland

Pennsylvania

Kline, Leon M., York

Wisconsin

Milwaukee Industrial Designers, Milwaukee

PACKAGING, CUSTOM

Gesell, R. Inc., New York, N. Y.
House of Price, New York, N. Y.
Jamieson, C. E. & Co., Detroit, Mich.
Neostyle, Inc., Chicago, Ill.
Peerless Packers, Inc., Bklyn, N. Y.
Strong Cobb & Co., Inc., Cleveland, Ohio
Trans-Pac Services, Inc., New York, N. Y.
Unit Packages, Inc., Elizabeth, N. J.

PACKETS

American Paper Goods Co., Kensington, Conn.
Andrews, P. L. Co., Bklyn, N. Y.
Berkowitz Envelope Co., Kansas City, Mo.
Bradner Smith & Co., Chicago, Ill.
Brooks & Porter, Inc., New York, N. Y.
Brown Bag Filling Machine Co., The, Fitchburg, Mass.
Continental Bag Specialties Corp., New York, N. Y.
Cupples-Hesse Corp., St. Louis, Mo.
Dennison Mfg. Co., Framingham, Mass.
Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Humitube Mfg. Co., Peoria, Ill.
Mason Envelope Co., New York, N. Y.
Neostyle, Inc., Chicago, Ill.
Oneida Paper Prods., Inc., New York, N. Y.
Reynolds Metals Co., Richmond, Va.
Royal Paper Corp., New York, N. Y.
Schmidt, Henry & Bro., Inc., Phila., Pa.
Stecher-Traung Litho. Corp., Rochester, N. Y.
Tension Envelope Corp., New York, N. Y.
Tower Envelope Co., New York, N. Y.
Traver Corp., Chicago, Ill.
U. S. Envelope Co., Springfield, Mass.
Wolf Bros., Phila., Pa.

PADDING & WADDING

American Lace Paper Co., Milwaukee, Wis.
Cellulose Wadding Products, Inc., Garwood, N. J.
Excelsior Paper Specialties Co., Inc., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Republic Paperboard Co., The, Cincinnati, Ohio
Rinkle Krinkle Paper Co., Boston, Mass.
Sweetnam, Geo. H. Inc., Cambridge, Mass.
Union Wadding Co., Pawtucket, R. I.

PAPER, ALKALI-PROOF

Bradner Smith & Co., Chicago, Ill.
Bulkley, Dunton & Co., New York, N. Y.
Carbide & Carbon Chemicals Corp., New York, N. Y.
Champion Paper & Fibre Co., Hamilton, Ohio
Chemical Paper Mfg. Co., Holyoke, Mass.
Dejonge, Louis & Co., New York, N. Y.
Fitchburg Paper Co., Fitchburg, Mass.
Hollingsworth & Whitney Co., Boston, Mass.
Holyoke Card & Paper Co., Springfield, Ohio
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Keller-Dorian Corp., New York, N. Y.
Matthias Paper Corp., Phila., Pa.
Newark Paraffine & Parchment Paper Co., Newark, N. J.

Plastic Coating Corp., Holyoke, Mass.
Port Huron Sulphite & Paper Co., Port Huron, Mich.
Riegel Paper Corp., New York, N. Y.
Smith, H. P. Paper Co., Chicago, Ill.
Union Carbide & Carbon Corp., New York, N. Y.
Warren, S. D. Co., Boston, Mass.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, ANTI-TARNISH

Bradner Smith & Co., Chicago, Ill.
Bulkley, Dunton & Co., New York, N. Y.
Chemical Paper Mfg. Co., Holyoke, Mass.
Crystal Tissue Co., The, Middletown, Ohio
Dejonge, Louis & Co., New York, N. Y.
Fitchburg Paper Co., Fitchburg, Mass.
Hollingsworth & Whitney Co., Boston, Mass.
Holyoke Card & Paper Co., Springfield, Mass.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Keller-Dorian Corp., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
Mosinee Paper Mills Co., Mosinee, Wis.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
Paterson Parchment Paper Co., Bristol, Pa.
Plastic Coating Corp., Holyoke, Mass.
Riegel Paper Corp., New York, N. Y.
Shawmut Waxed Paper Co., Holliston, Mass.
Smith, H. P. Paper Co., Chicago, Ill.
Sweetman, Geo. H. Inc., Cambridge, Mass.
Warren, S. D. Co., Boston, Mass.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, CELLULOSE LAMINATED

Central Waxed Paper Co., Chicago, Ill.
Dobackmun Co., The, Cleveland, Ohio
Keller-Dorian Corp., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
McLaurin-Jones Co., Brookfield, Mass.
Shellmar Products Co., Mt. Vernon, Ohio
Smith, H. P. Paper Co., Chicago, Ill.
Southern Waxed Paper Co. Atlanta, Ga.
U. S. Finishing & Mfg. Co., Chicago, Ill.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, CORRUGATED

(Flexible, Wrapping & Packing)

Ashtabula Corrugated Box Co., The, Ashtabula, Ohio
Blake, Moffitt & Towne, San Francisco, Calif.
Fibreboard Products, Inc., San Francisco, Calif.
Fort Wayne Corrugated Paper Co., Fort Wayne, Ind.
Gair, Robert Co., Inc., New York, N. Y.
Grand-City Container Corp., New York, N. Y.
Hinde & Dauch Paper Co., Sandusky, Ohio
Inland Container Corp., Indianapolis, Ind.
Kress, F. J. Box Co., Pittsburgh, Pa.
National Container Corp., Long Island City, N. Y.
Owens-Illinois Packaging Service, Toledo, Ohio
Salwen, Joe Paper Co., New York, N. Y.
Sherman Paper Products Corp., Newton Upper Falls, Mass.
Sweetnam, Geo. H. Inc., Cambridge, Mass.

PAPER, CORRUGATED

(For Window Trimming)

Excelsior Paper Specialties Co., Inc., New York, N. Y.
Fibreboard Prods., Inc., San Francisco, Calif.

Hankins Container Co., Cleveland, Ohio
Hinde & Dauch Paper Co., Sandusky, Ohio
Inland Container Corp., Indianapolis, Ind.
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
Sherman Paper Products Corp., Newton
 Upper Falls, Mass.
Sweetnam, Geo. H. Inc., Cambridge, Mass.

PAPER, CREPE

American Tissue Mills, Holyoke, Mass.
Dennison Mfg. Co., Framingham, Mass.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
 Mosinee Paper Mills Co., Mosinee, Wis.
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
 Rinkle Krinkle Paper Co., Boston, Mass.
Sherman Paper Products Corp., Newton
 Upper Falls, Mass.
Sweetnam, Geo. H. Inc., Cambridge, Mass.

PAPER, EXCELSIOR & SHREDDED

American Excelsior Corp., Chicago, Ill.
 Atlantic Excelsior Co., Inc., New York, N. Y.
 Ben Mont Papers, Inc., Bennington, Vt.
 Crystal Tissue Co., The, Middletown, Ohio
 Daniels Mfg. Co., Rhinelander, Wis.
Dennison Mfg. Co., Framingham, Mass.
 Excelsior Paper Specialties Co., Inc., New York, N. Y.
Inland Container Corp., Indianapolis, Ind.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
 Specialty Papers Co., Dayton, Ohio
Sweetnam, Geo. H. Inc., Cambridge, Mass.

PAPER, FANCY PRINTED OR EMBOSSED

Aldine Paper Co., Inc., New York, N. Y.
 Ben Mont Papers, Inc., Bennington, Vt.
 Blake, Moffitt & Towne, San Francisco, Calif.
 Bradner Smith & Co., Chicago, Ill.
 Chemical Paper Mfg. Co., Holyoke, Mass.
Chicago Printed String Co., Chicago, Ill.
 Crown Zellerbach Corp., San Francisco, Calif.
 Crystal Tissue Co., The, Middletown, Ohio
 Decotone Products, Fitchburg, Mass.
 Dejonge, Louis & Co., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
 District of Columbia Paper Mills, Inc., Washington, D. C.
 Eureka Specialty Prg. Co., Scranton, Pa.
 Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
 Hinkson Paper Co., Palmer, Mass.
 Holyoke Card & Paper Co., Springfield, Mass.
 Hughes & Hoffman, New York, N. Y.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
 Keller-Dorian Corp., New York, N. Y.
 Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
 Matthias Paper Corp., Phila., Pa.
Middlesex Prod. Corp., Cambridge, Mass.
 Narragansett Coated Paper Corp., Pawtucket, R. I.
 Nashua Gummed & Coated Paper Co., Nashua, N. H.
 New England Card & Paper Co., Inc., Springfield, Mass.
 Paper Affiliates Co., Inc., New York, N. Y.
 Paper City Mfg. Co., Inc., Holyoke, Mass.
 Pejepsco Paper Co., New York, N. Y.
 Plastic Coating Corp., Holyoke, Mass.
 Racquette River Paper Co., Potsdam, N. Y.
 Reynolds Metals Co., Richmond, Va.
Riegel Paper Corp., New York, N. Y.
 Royal Paper Corp., New York, N. Y.
 Simplex Textured Reproductions, Inc., New York, N. Y.

Springfield Coated Paper Corp., Camden, N. J.
 Stecher-Traung Lithograph Corp., Rochester, N. Y.
 Stevens-Nelson Paper Corp., The, New York, N. Y.
Sweetnam, Geo. H. Inc., Cambridge, Mass.
 Trautmann, Bailey & Blampey, New York, N. Y.
Traver Corp., Chicago, Ill.
 United Mfg. Co., Springfield, Mass.
 Williams, Chas. W. & Co., Inc., New York, N. Y.
 Wyomissing Glazed Paper Co., Reading, Pa.

PAPER, FINISHERS (Lacquers & Varnishes)

American Label Cutting Co., New York, N. Y.
 Chasen, Alex & Co., Phila., Pa.
 Chatfield Paper Co., Cincinnati, Ohio
 Crawford, John W. Co., New York, N. Y.
 Johnston Paper Co., The, Cincinnati, Ohio
 Lithographers Finishing Co., New York, N. Y.
 Lowery & Schwartz, Inc., New York, N. Y.
 McCoy Paper Converters, Phila., Pa.
 Mor-Gan Laminating & Polishing, New York, N. Y.
 Perfect Finishing Co., Inc., New York, N. Y.
 Schneider Bros. Co., Phila., Pa.
 Southern Waxed Paper Co., Atlanta, Ga.
 U. S. Finishing & Mfg. Co., Chicago, Ill.
 Wiener Bros. Co., Inc., New York, N. Y.

PAPER, FLINT GLAZED

Blake, Moffitt & Towne, San Francisco, Calif.
 Bradner Smith & Co., Chicago, Ill.
 Dejonge, Louis & Co., New York, N. Y.
Fitchburg Paper Co., Fitchburg, Mass.
 Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
 Hinkson Paper Co., Palmer, Mass.
 Hughes & Hoffman, New York, N. Y.
 Kupfer Bros. Paper Co., New York, N. Y.
 Matthias Paper Corp., Phila., Pa.
 McLaurin-Jones Co., Brookfield, Mass.
 Paper Affiliates Co., Inc., New York, N. Y.
Royal Paper Corp., New York, N. Y.
 United Mfg. Co., Springfield, Mass.
 Williams, Chas. W. & Co., Inc., New York, N. Y.
 Wyomissing Glazed Paper Co., Reading, Pa.

PAPER, FRICTION GLAZED

Blake, Moffitt & Towne, San Francisco, Calif.
 Bradner Smith & Co., Chicago, Ill.
 Crown Zellerbach Corp., San Francisco, Calif.
 Dejonge, Louis & Co., New York, N. Y.
Fitchburg Paper Co., Fitchburg, Mass.
 Hampden Glazed Paper & Card Co., Holyoke, Mass.
 Hinkson Paper Co., Palmer, Mass.
 Hughes & Hoffman, New York, N. Y.
 Keller-Dorian Corp., New York, N. Y.
 Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
 Matthias Paper Corp., Phila., Pa.
Middlesex Products Corp., Cambridge, Mass.
 Narragansett Coated Paper Corp., Pawtucket, R. I.
 Nashua Gummed & Coated Paper Co., Nashua, N. H.
 Paper Affiliates Co., Inc., New York, N. Y.
Royal Paper Corp., New York, N. Y.
 Springfield Coated Paper Corp., Camden, N. J.
 United Mfg. Co., Springfield, Mass.
 Williams, Chas. W. & Co., Inc., New York, N. Y.
 Wyomissing Glazed Paper Co., Reading, Pa.

PAPER, GLASSINE (Plain & Embossed)

Daniels Mfg. Co., Rhinelander, Wis.
 Deerfield Glassine Co., Monroe Bridge, Mass.
Dennison Mfg. Co., Framingham, Mass.
 Glassine Paper Co., Conshohocken, Pa.
 Hamersley Mfg. Co., The, Garfield, N. J.
 Hartford City Paper Co., New York, N. Y.
 Nashua Gummed & Coated Paper Co., Nashua, N. H.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
 Rhinelander Paper Co., Rhinelander, Wis.
Riegel Paper Corp., New York, N. Y.
 Smith, H. P. Paper Co., Chicago, Ill.
 Southern Waxed Paper Co., Atlanta, Ga.
Westfield River Paper Co., Inc., Russell, Mass.

PAPER, GUMMED

Angier Corp., Framingham, Mass.
Better Packages, Inc., Shelton, Conn.
 Brown-Bridge Mills, Inc., The, Troy, Ohio
Dennison Mfg. Co., Framingham, Mass.
 Eureka Specialty Printing Co., Scranton, Pa.
 Gummed Products Co., The, Troy, Ohio
 Gummed Tape & Devices Co., Bklyn, N. Y.
Knowlton, M. D. Co., Rochester, N. Y.
 Matthias Paper Corp., Phila., Pa.
 McLaurin-Jones Co., Brookfield, Mass.
 Mid-States Gummed Paper Co., Chicago, Ill.
 Nashua Gummed & Coated Paper Co., Nashua, N. H.
 Rexford Paper Co., Milwaukee, Wis.

PAPER, IMITATION LEATHER

Aldine Paper Co., Inc., New York, N. Y.
 Atlas Powder Co., Zapon Div., Stamford, Conn.
 Blake, Moffitt & Towne, San Francisco, Calif.
 Bradner Smith & Co., Chicago, Ill.
 Columbus Coated Fabrics Corp., Columbus, Ohio
 Dejonge, Louis & Co., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
 Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
 Hinkson Paper Co., Palmer, Mass.
 Holyoke Card & Paper Co., Springfield, Mass.
 Hughes & Hoffman, New York, N. Y.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
 Keller-Dorian Corp., New York, N. Y.
 Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
 Matthias Paper Corp., Phila., Pa.
Middlesex Products Corp., Cambridge, Mass.
 Narragansett Coated Paper Corp., Pawtucket, R. I.
 New England Card & Paper Co., Inc., Springfield, Mass.
 Paper Affiliates Co., Inc., New York, N. Y.
 Plastic Coating Corp., Holyoke, Mass.
 Pyrotex Leather Co., Leominster, Mass.
 Racquette River Paper Co., Potsdam, N. Y.
Riegel Paper Corp., New York, N. Y.
Royal Paper Corp., New York, N. Y.
 Springfield Coated Paper Corp., Camden, N. J.
 Textile Leather Corp., Toledo, Ohio
 United Mfg. Co., Springfield, Mass.
 Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, KRAFT

Angier Corp., Framingham, Mass.

Addresses of companies listed appear on pages 622-630

Arkell Safety Bag Co., New York, N. Y.
Brown Co., Portland, Me.
Gaylord Container Corp., St. Louis, Mo.
Hollingsworth & Whitney Co., Boston, Mass.
International Paper Co., New York, N. Y.
Mosinee Paper Mills Co., Mosinee, Wis.
St. Regis Paper Co., New York, N. Y.
Sisalkraft Co., The Chicago, Ill.
Union Bag & Paper Corp., New York, N. Y.
West Virginia Pulp & Paper Co., New York, N. Y.

PAPER, METALLIC-COATED (Plain and Embossed)

Aldine Paper Co., Inc., New York, N. Y.
Artcote Papers, Inc., Irvington, N. J.
Blake, Moffitt & Towne, San Francisco, Calif.
Bradner Smith & Co., Chicago, Ill.
Decotone Products, Fitchburg, Mass.
Dejonge, Louis & Co., New York, N. Y.
Eureka Specialty Printing Co., Scranton, Pa.
Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
Hinkson Paper Co., Palmer, Mass.
Holyoke Card & Paper Co., Springfield, Mass.
Huges & Hoffman, New York, N. Y.
Johnston Tin Foil & Metal Co., The, St. Louis, Mo.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Keller-Dorian Corp., New York, N. Y.
Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
McLaurin-Jones Co., Brookfield, Mass.
Middlesex Products Corp., Cambridge, Mass.
Miller Paper Co., New York, N. Y.
Narragansett Coated Paper Corp., Pawtucket, R. I.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
New England Card & Paper Co., Inc., Springfield, Mass.
Paper Affiliates Co., Inc., New York, N. Y.
Plastic Coating Corp., Holyoke, Mass.
Pyrotex Leather Co., Leominster, Mass.
Racquette River Paper Co., Potsdam, N. Y.
Reynolds Metals Co., Richmond, Va.
Riegel Paper Corp., New York, N. Y.
Royal Paper Corp., New York, N. Y.
Springfield Coated Paper Corp., Camden, N. J.
Stevens-Nelson Paper Corp., The, New York, N. Y.
United Mfg. Co., Springfield, Mass.
Williams, Chas. W. & Co., Inc., New York, N. Y.
Wyomissing Glazed Paper Co., Reading, Pa.

PAPER, MOISTURE-VAPOR RESISTANT

Bulkley, Dunton & Co., New York, N. Y.
Dejonge, Louis & Co., New York, N. Y.
Dobeckmun Co., The, Cleveland, Ohio
Hazen Paper Co., Holyoke, Mass.
Holyoke Card & Paper Co., Springfield, Mass.
Keller-Dorian Corp., New York, N. Y.
Marvellum Co., Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
McLaurin-Jones Co., Brookfield, Mass.
Paterson Parchment Paper Co., Bristol, Pa.
Plastic Coating Corp., Holyoke, Mass.
Reynolds Metals Co., Richmond, Va.
Riegel Paper Corp., New York, N. Y.
Shawmut Waxed Paper Co., Holliston, Mass.
Southern Waxed Paper Co., Atlanta, Ga.
U. S. Finishing & Mfg. Co., Chicago, Ill.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, PARCHMENT

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
Paterson Parchment Paper Co., Bristol, Pa.
Shawmut Waxed Paper Co., Holliston, Mass.

PAPER, PYROXYLIN-COATED

Artcote Papers, Inc., Irvington, N. J.
Blake, Moffitt & Towne, San Francisco, Calif.
Bradner Smith & Co., Chicago, Ill.
Dejonge, Louis & Co., New York, N. Y.
Dennison Mfg. Co., Framington, Mass.
Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
Keller-Dorian Corp., New York, N. Y.
McLaurin-Jones Co., Brookfield, Mass.
Marvellum Co., The, Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
Miller Paper Co., New York, N. Y.
Narragansett Coated Paper Corp., Pawtucket, R. I.
Paper Affiliates Co., Inc., New York, N. Y.
Plastic Coating Corp., Holyoke, Mass.
Royal Paper Corp., New York, N. Y.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, TISSUE

Adams Paper Co., Wells River, Vt.
American Tissue Mills, Holyoke, Mass.
Ashuelot Paper Co., Hinsdale, N. H.
Ben Mont Papers, Inc., Bennington, Vt.
Berwin Paper Corp., Dansville, N. Y.
Brooks Paper Co., St. Louis, Mo.
Burrows Paper Corp., Little Falls, N. Y.
Central Paper Corp., Muskegon, Mich.
Chicago Printed String Co., Chicago, Ill.
Consolidated Water & Power Co., Wisconsin Rapids, Wis.
Coy Paper Co., Claremont, N. H.
Crown-Willamette Paper Co., San Francisco, Calif.
Dennison Mfg. Co., Framingham, Mass.
Detroit Sulphite & Paper Co., Detroit, Mich.
Dexter, C. H. & Sons, Inc., Windsor Locks, Conn.
Diamond Paper Mills Co., Inc., New York, N. Y.
Dunn Sulphite Paper Co., Port Huron, Mich.
Earl, M. J. Co., Inc., Reading, Pa.
Economy Box & Pie Plate Co., Marion, Ind.
Eden Paper Co., Lancaster, Pa.
Erving Paper Mills, Erving, Mass.
Fennstrom Paper Mills, Inc., Pomona, Calif.
Fillmore & Slade, No. Bennington, Vt.
Flower City Tissue Mills Co., Rochester, N. Y.
Fort Howard Paper Co., Green Bay, Wis.
Frost White Paper Mills, Inc., New York, N. Y.
General Cellulose Co., Inc., The, Garwood, N. J.
Gotham Tissue Corp., New York, N. Y.
Graham Mfg. Co., Holyoke, Mass.
Hamersley Mfg. Co., Garfield, N. J.
Hawley Pulp & Paper Co., Portland, Ore.
Hoberg Paper Mills, Green Bay, Wis.
Hudson Pulp & Paper Corp., New York, N. Y.
International Paper Co., New York, N. Y.
Latimer, E. Jr., & Co., Phila., Pa.
Little Falls Paper Co., Inc., Newburgh, N. Y.
McIntyre Bros. Paper Co., Inc., Fayetteville, N. Y.
Menasha Products Co., Menasha, Wis.
Minerva Wax Paper Co., Minerva, Ohio
Mohawk Valley Paper Co., Inc., Little Falls, N. Y.

Moyer & Pratt, Inc., Lyonsdale, N. Y.
North American Pulp & Paper Co., New York, N. Y.
North End Paper Co., Fulton, N. Y.
Northern Paper Mills, Green Bay, Wis.
Oswego River Paper Mills, Phoenix, N. Y.
Pacific Coast Paper Mills, Bellingham, Wash.
Peerless Paper Mills, Inc., Oaks, Pa.
Pequannock Valley Paper Co., Butler, N. J.
Port Huron Sulphite & Paper Co., Port Huron, Mich.
Reed Tissue Corp., Little Falls, N. Y.
River Valley Tissue Mills, Inc., Phoenix, N. Y.
Robertson Co., The, Hinsdale, N. H.
Robertson, G. E. & Co., Hinsdale, N. H.
Rondout Paper Mills, Inc., Napanoch, N. Y.
Rushmore Paper Mills, Inc., Natural Dam, N. Y.
Russell Products Co., Phila., Pa.
Sanitary Paper Mills, Inc., East Hartford, Conn.
Senoso Paper Co., Inc., Phoenix, N. Y.
Smith Paper, Inc., Lee, Mass.
Southern Waxed Paper Co., Atlanta, Ga.
Stevens & Thompson Paper Co., Inc., Greenwich, N. Y.
Sweet Bros. Paper Mfg. Co., Phoenix, N. Y.
Thilmany Pulp & Paper Co., Kaukauna, Wis.
Tissue Co., Saugerties, N. Y.
Tuttle Press Co., The, Appleton, Wis.
Victoria Paper Mills Co., Fulton, N. Y.
Waterproof Paper & Board Co., Cincinnati, Ohio
Weber Supply Co., Mokense, Ill.
White River Paper Mills, Inc., Indianapolis, Ind.
White-Washburn Co., Inc., Hinsdale, N. H.
Wisconsin Tissue Mills, Menasha, Wis.

PAPER, TRADEMARK

Aldine Paper Co., Inc., New York, N. Y.
Blake, Moffitt & Towne, San Francisco, Calif.
Bradner Smith & Co., Chicago, Ill.
Decotone Products, Fitchburg, Mass.
Dejonge, Louis & Co., New York, N. Y.
District of Columbia Paper Mills, Inc., Washington, D. C.
Fitchburg Paper Co., Fitchburg, Mass.
Hampden Glazed Paper & Card Co., Holyoke, Mass.
Hazen Paper Co., Holyoke, Mass.
Holyoke Card & Paper Co., Springfield, Mass.
Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Pejepscot Paper Co., New York, N. Y.
Plastic Coating Corp., Holyoke, Mass.
Racquette River Paper Co., Potsdam, N. Y.
Royal Paper Corp., New York, N. Y.
Springfield Coated Paper Corp., Camden, N. J.
Westfield River Paper Co., Inc., Russell, Mass.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, TRANSPARENT

See Transparent Materials

PAPER, VELOUR

(Plain, Printed and Embossed)

Blake, Moffitt & Towne, San Francisco, Calif.
Bradner Smith & Co., Chicago, Ill.
Cellusuede Products, Inc., Rockford, Ill.
Dejonge, Louis & Co., New York, N. Y.

District of Columbia Paper Mills, Inc., Washington, D. C.
Keller-Dorian Corp., New York, N. Y.
Kupfer Bros. Paper Co., New York, N. Y.
Matthias Paper Corp., Phila., Pa.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, WAXED

American Tissue Mills, Holyoke, Mass.
Ben Mont Papers, Inc., Bennington, Vt.
Central Waxed Paper Co., Inc., Chicago, Ill.
Crystal Tissue Co., The, Middletown, Ohio
Dixie Wax Paper Co., Inc., Dallas, Tex.
Hamersley Mfg. Co., The, Garfield, N. J.
Henle Wax Paper Mfg. Co., Inc., New York, N. Y.
Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Menasha Products Co., The, Menasha, Wis.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
Paterson Parchment Paper Co., Bristol, Pa.
Port Huron Sulphite & Paper Co., Port Huron, Mich.
Riegel Paper Corp., New York, N. Y.
Shawmut Waxed Paper Co., Holliston, Mass.
Smith, H. P. Paper Co., Chicago, Ill.
Southern Waxed Paper Co., Atlanta, Ga.
Thilmany Pulp & Paper Co., Kaukauna, Wis.
Waterproof Paper & Board Co., Cincinnati, Ohio

PAPER, WOOD VENEER (Imitation)

Aldine Paper Co., Inc., New York, N. Y.
Blake, Moffitt & Towne, San Francisco, Calif.
Bradner Smith & Co., Chicago, Ill.
Central Waxed Paper Co., Chicago, Ill.
Dejonge, Louis & Co., New York, N. Y.
District of Columbia Paper Mills, Inc., Washington, D. C.
Hampden Glazed Paper & Card Co., Holyoke Mass.
Hazen Paper Co., Holyoke, Mass.
Hinkson Paper Co., Palmer, Mass.
Holyoke Card & Paper Co., Springfield, Mass.
Hughes & Hoffman, New York, N. Y.
Keller-Dorian Corp., New York, N. Y.
Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
Middlesex Products Co., Cambridge, Mass.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Paper Affiliates Co., Inc., New York, N. Y.
Racquette River Paper Co., Potsdam, N. Y.
Royal Paper Corp., New York, N. Y.
Sherman Paper Products Corp., Newton Upper Falls, Mass.
Springfield Coated Paper Corp., Camden, N. J.
Stevens-Nelson Paper Corp., The, New York, N. Y.
United Mfg. Co., Springfield, Mass.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PAPER, WRAPPING (Fancy Tissue)

Aldine Paper Co., Inc., New York, N. Y.
American Tissue Mills, Holyoke, Mass.
Ben Mont Papers, Inc., Bennington, Vt.
Bradner Smith & Co., Chicago, Ill.
Chicago Printed String Co., Chicago, Ill.
Crown Zellerbach Corp., San Francisco, Calif.

Crystal Tissue Co., The, Middletown, Ohio
Decotone Products, Fitchburg, Mass.
Dejonge, Louis & Co., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Du-Tone Ribbon Corp., New York, N. Y.
Hampden Glazed Paper & Card Co., Holyoke, Mass.

Hazen Paper Co., Holyoke, Mass.
Kupfer Bros. Paper Co., New York, N. Y.
Marvellum Co., The, Holyoke, Mass.
Matthias Paper Corp., Phila., Pa.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Pejepscot Paper Co., New York, N. Y.
Royal Paper Corp., New York, N. Y.
Springfield Coated Paper Corp., Camden, N. J.
Stevens-Nelson Paper Corp., The, New York, N. Y.
Williams, Chas. W. & Co., Inc., New York, N. Y.

PARTITIONS

Kress, F. J. Box Co., Pittsburgh, Pa.
Traver Corp., Chicago, Ill.

PICTURES, BOX TOP

Bleier, Milton A., New York, N. Y.
Blum, Emery & Co., Inc., New York, N. Y.
Economy Novelty Co., New York, N. Y.
Nalco, Inc., New York, N. Y.
Paper Affiliates Co., Inc., New York, N. Y.

PLASTIC MATERIALS, ACRYLATE AND METHYL METHACRYLATE

du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Rohm & Haas Co., Inc., Phila., Pa.

PLASTIC MATERIALS, CASEIN

American Plastics Corp., New York, N. Y.
Morrell, George Corp., Muskegon Heights, Mich.

PLASTIC MATERIALS, CAST PHENOL

Bakelite Corp., New York, N. Y.
Catalin Corp., New York, N. Y.
Knoedler, A. Co., Lancaster, Pa.
Marblette Corp., Long Island City, N. Y.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.

PLASTIC MATERIALS, CELLULOSE ACETATE

Bakelite Corp., New York, N. Y.
Celanese Celluloid Corp., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Nixon Nitration Works, Nixon, N. J.
Tennessee Eastman Corp., Kingsport, Tenn.

PLASTIC MATERIALS, CELLULOSE ACETATE BUTYRATE

Celanese Celluloid Corp., New York, N. Y.
Tennessee Eastman Corp., Kingsport, Tenn.

PLASTIC MATERIALS, CELLULOSE NITRATE, PYROXYLIN

Celanese Celluloid Corp., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Hercules Powder Co., Wilmington, Del.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Nixon Nitration Works, Nixon, N. J.

PLASTIC MATERIALS, ETHYL CELLULOSE

Celanese Celluloid Corp., New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Hercules Powder Co., Wilmington, Del.
Nixon Nitration Works, Nixon, N. J.

PLASTIC MATERIALS, MELAMINE FORMALDEHYDE

American Cyanamid Co., Plastics Div., New York, N. Y.
Catalin Corp., New York, N. Y.
Plaskon Co., Inc., Toledo, Ohio

PLASTIC MATERIALS, PHENOL- FORMALDEHYDE

Bakelite Corp., New York, N. Y.
Durez Plastics & Chemicals, Inc., N. Tonawanda, N. Y.
Durite Plastics, Inc., Phila., Pa.
Heresite & Chemicals Co., Manitowoc, Wis.
Makalot Corp., Boston, Mass.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Reilly Tar & Chemical Corp., Indianapolis, Ind.

PLASTIC MATERIALS, PHENOL- FURFURAL

Durite Plastics, Inc., Phila., Pa.

PLASTIC MATERIALS, STYRENE

Bakelite Corp., New York, N. Y.
Catalin Corp., New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Nixon Nitration Works, Nixon, N. J.

PLASTIC MATERIALS, UREA- FORMALDEHYDE

American Cyanamid Co., Plastics Div., New York, N. Y.
Bakelite Corp., New York, N. Y.
Plaskon Co., Inc., Toledo, Ohio

PLASTIC MATERIALS, VINYLIDENE CHLORIDE

Dow Chemical Co., The, Midland, Mich.

PLASTIC MATERIALS, VINYL RESIN

Carbide & Carbon Chemicals Corp., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Union Carbide & Carbon Corp., New York, N. Y.

POTTERY CONTAINERS

Floramics Co., The, Tampa, Fla.
Greene's Ceramic Products Co., Inc., Sebring, Ohio
Hull, A. E. Pottery Co., Crooksville, Ohio
Na-Mac Products Corp., Los Angeles, Calif.
Purinton Pottery Co., Wellesville, Ohio
Robinson Clay Product Co., New York, N. Y.
Spaulding China Co., Inc., Sebring, Ohio
Western Stoneware Co., Monmouth, Ill.
Zanesville Stoneware Co., Zanesville, Ohio

PRESSES, PRINTING (Aniline)

Champlain Div., Interchemical Corp., New York, N. Y.

Cottrell, C. B. & Sons Co., Claybourn Div., Milwaukee, Wis.
 Heinrich, H. H. Inc., New York, N. Y.
 Henschel, C. B. Mfg. Co., Milwaukee, Wis.
Hudson-Sharp Machine Co., Green Bay, Wis.
 Kidder Press Co., Inc., Dover, N. H.
 Marconetti, A. E. Inc., New York, N. Y.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Co., E. Boston, Mass.
 Rutherford Machinery Co., Div. General Printing Ink Corp., New York, N. Y.
 Staude, E. G. Mfg. Co., St. Paul, Minn.
 Waldron, John Corp., New Brunswick, N. J.

PRESSES, PRINTING (Letterpress)

Champlain Div., Interchemical Corp., New York, N. Y.
 Cottrell, C. B. & Sons Co., Claybourn Div., Milwaukee, Wis.
Harris-Seybold-Potter Co., Dayton, Ohio
Hudson-Sharp Machine Co., Green Bay, Wis.
 Kidder Press Co., Inc., Dover, N. H.
Markem Machine Co., Keene, N. H.
Meisel Press Mfg. Co., Boston, Mass.
 Miehle Printing Press Mfg. Co., Chicago, Ill.
 Miller Printing Machy. Co., Pittsburgh, Pa.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Co., E. Boston, Mass.
 Rutherford Machinery Co., Div. General Ptg. Ink Corp., New York, N. Y.
 Staude, E. G. Mfg. Co., St. Paul, Minn.
 Stokes & Smith Co., Philadelphia, Pa.

PRESSES, PRINTING (Lithographic)

Harris-Seybold-Potter Co., Dayton, Ohio
 Hoe, R. & Co., Inc., New York, N. Y.
 Kidder Press Co., Inc., Dover, N. H.
Meisel Press Mfg. Co., Boston, Mass.
 Miehle Printing Press Mfg. Co., Chicago, Ill.
 Rutherford Machinery Co., Div. Gen. Ptg. Ink Corp., New York, N. Y.
 Webendorfer-Wills Co., Div. American Type Founders Sales Corp., Mt. Vernon, N. Y.

PRESSES, PRINTING (Raised)

Meisel Press Mfg. Co., Boston, Mass.
 Rotogravure Engineering Co., E. Boston, Mass.

PRESSES, PRINTING (Rotogravure)

Champlain Div., Interchemical Corp., New York, N. Y.
 Cottrell, C. B. & Sons Co., Claybourn Div., Milwaukee, Wis.
 Goss Printing Press Co., Chicago, Ill.
Harris-Seybold-Potter Co., Dayton, Ohio
 Hoe, R. & Co., New York, N. Y.
Hudson-Sharp Machine Co., Green Bay, Wis.
 Kidder Press Co., Inc., Dover, N. H.
 Marconetti, A. E. Inc., New York, N. Y.
Meisel Press Mfg. Co., Boston, Mass.
 Potdevin Machine Co., Bklyn, N. Y.
 Rotogravure Engineering Co., E. Boston, Mass.
 Staude, E. G. Mfg. Co., St. Paul, Minn.
 Waldron, John Corp., New Brunswick, N. J.

RIBBONS & TIES, COTTON

Chicago Printed String Co., Chicago, Ill.
 Dennison Mfg. Co., Framingham, Mass.

Economy Novelty & Printing Co., New York, N. Y.
 Fibre Cord Co., New York, N. Y.
 Freyberg Bros.-Strauss, Inc., New York, N. Y.
 Stark Bros. Ribbon Corp., New York, N. Y.
 W-E-R Ribbon Corp., New York, N. Y.

RIBBONS & TIES, RAYON

Buser, R. G. Corp., Paterson, N. J.
 Century Ribbon Mills, New York, N. Y.
 Du-Tone Ribbon Corp., New York, N. Y.
 Fibre Cord Co., New York, N. Y.
 Freyberg Bros.-Strauss, Inc., New York, N. Y.
 General Ribbon Mills, Catsauqua, Pa.
 Ketcham, Howard Inc., New York, N. Y.
 Stark Bros. Ribbon Co., New York, N. Y.
 Welwood, John C. Corp., New York, N. Y.
 W-E-R Ribbon Corp., New York, N. Y.
 Wright, Wm. E. & Sons Co., West Warren, Mass.

RIBBONS & TIES, TRANSPARENT

Dennison Mfg. Co., Framingham, Mass.
 Du-Tone Ribbon Corp., Chicago, Ill.
 Fibre Cord Co., New York, N. Y.
 Freyberg Bros.-Strauss, Inc., New York, N. Y.
 Milprint, Inc., Milwaukee, Wis.
 Shellmar Products Co., Mt. Vernon, Ohio
 Stark Bros. Ribbon Corp., New York, N. Y.
 W-E-R Ribbon Corp., New York, N. Y.

ROLL LEAF, STAMPING FOIL

Coughlin Mfg. Co., New York, N. Y.
 Griffin, Campbell, Hayes, Walsh, Inc., New York, N. Y.
Markem Machine Co., Keene, N. H.
 Nashua Gummed & Coated Paper Co., Nashua, N. H.
 Peerless Roll Leaf Co., Inc., Union City, N. J.

ROLLS, CLOTH & IMITATION LEATHER

Cottonluxe Mfg. Co., New York, N. Y.
 Eureka Mfg. Co., Inc., Taunton, Mass.

SCALES, AUTOMATIC CHECK WEIGHERS

Amsco Packaging Machinery, Inc., Long Island City, N. Y.
 Arenco Machine Co., Inc., New York, N. Y.
 Consolidated Packaging Machinery Corp., Buffalo, N. Y.
 Detecto Scales, Inc., Bklyn, N. Y.
Exact Weight Scale Co., The, Columbus, Ohio
 Goat, Fred Co., Inc., The, Bklyn, N. Y.
 Gump, B. F. Co., Chicago, Ill.
 Howe Scale Co., The, Rutland, Vt.
 Merrick Scale Mfg. Co., Passaic, N. J.
Pneumatic Scale Corp., Ltd., North Quincy, Mass.
 Stokes & Smith Co., Phila., Pa.
Toledo Scale Corp., Toledo, Ohio
 Triangle Package Machinery Co., Chicago, Ill.

SCALES, FREIGHT, EXPRESS

Detecto Scales, Inc., Bklyn, N. Y.
Exact Weight Scale Co., The, Columbus, Ohio
 Howe Scale Co., The, Rutland, Vt.
 Toledo Scale Corp., Toledo, Ohio

SCALES, OVER & UNDER WEIGHT

Arenco Machine Co., Inc., New York, N. Y.
 Detecto Scales, Inc., Bklyn, N. Y.

Exact Weight Scale Co., The, Columbus, Ohio
 Howe Scale Co., The, Rutland, Vt.
 Merrick Scale Mfg. Co., Passaic, N. J.
 Thwing-Albert Instrument Co., Phila., Pa.
Toledo Scale Corp., Toledo, Ohio

SEALS

(Embossed on Paper, Foil, Etc.)

See also Closures, Secondary

Attleboro Printing & Embossing Co., Inc., Attleboro, Mass.
 Bartlett Label Co., Kalamazoo, Mich.
Cameo Die & Label Co., New York, N. Y.
 Chaspec Mfg. Co., New York, N. Y.
Chicago Printed String Co., Chicago, Ill.
 Consolidated Lithographing Corp., Bklyn, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Ever Ready Label Corp., New York, N. Y.
 Fitzhugh, Wm. W. Inc., Bklyn, N. Y.
Foxon Co., The, Providence, R. I.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
 Grand Rapids Label Co., Grand Rapids, Mich.
 Kaumagraph Co., Wilmington, Del.
 Krause, Richard M. Inc., New York, N. Y.
 Lambooy Label & Wrapper Co., Kalamazoo, Mich.
 Lehmann Printing & Litho. Co., San Francisco, Calif.
 Milwaukee Label & Seal Co., Milwaukee, Wis.
 Muirson Label Co., Inc., Bklyn, N. Y.
 Pacific Label Co., Los Angeles, Calif.
 Pollock Paper & Box Co., Dallas, Tex.
 Reyburn Mfg. Co., Inc., The, Phila., Pa.
 Reynolds Metals Co., Richmond, Va.
 St. Louis Sticker Co., St. Louis, Mo.
 Tablet & Ticket Co., The, Chicago, Ill.
 Tompkins' Label Service, Phila., Pa.
 Unique Printed Products Co., Inc., Terre Haute, Ind.
Wheeler-Van Label Corp., Grand Rapids, Mich.

SHEETING, TRANSPARENT RIGID

Carbide & Carbon Chemicals Corp., New York, N. Y.
 Celanese Celluloid Corp., New York, N. Y.
 Dow Chemical Co., The, Midland, Mich.
 du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
 Eastman Kodak Co., Rochester, N. Y.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
 Union Carbide & Carbon Corp., New York, N. Y.

SHIPPING CONTAINERS

See Boxes, Corrugated & Solid Fibre

SPRAYERS

Bronzart Metals Co., New York, N. Y.
 Federal Tool Corp., Chicago, Ill.
 Glass Industries, Inc., New York, N. Y.
 Scovill Mfg. Co., Waterbury, Conn.
 Wilco Co., Los Angeles, Calif.

STAPLES, WIRE

Acme Staple Co., Camden, N. J.
 Bates Mfg. Co., The, New York, N. Y.
 Bostitch, Inc., East Greenwich, R. I.
 Grammes, L. F. & Sons, Inc., Allentown, Pa.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
 International Staple & Machine Co., Clifton Heights, Pa.
 Paslode Co., Chicago, Ill.

STENCIL BOARD

(Oiled & Unoiled)

Bradley, A. J. Mfg. Co., Long Island City, N. Y.
Cromwell Paper Co., The, Chicago, Ill.
Diagraph-Bradley Stencil Machine Corp., St. Louis, Mo.
Garvey Fountain Ink & Brush Co., St. Louis, Mo.
Hewitt, C. B. & Bros., Inc., New York, N. Y.
Ideal Stencil Machine Co., Belleville, Ill.
Marsh Stencil Machine Co., Belleville, Ill.
Matthews, Jas. H. & Co., Pittsburgh, Pa.
Metal Marker Mfg. Co., Cleveland, Ohio
National Waterproofing Co., Camden, N. J.
Noble & Westbrook Mfg. Co., East Hartford, Conn.
O'Malley, M. J. Co., Springfield, Mass.
Schwerdtle Stamp Co., Bridgeport, Conn.

STOPPERS, RUBBER

Armstrong Cork Co., Lancaster, Pa.

STRAPPING, STEEL

Acme Steel Co., Chicago, Ill.
Gerrard Co., Inc., The, Chicago, Ill.
Signode Steel Strapping Co., Chicago, Ill.
Stanley Works, The, New Britain, Conn.

STRING, PRINTED

(Plain and Decorative)

Chicago Printed String Co., Chicago, Ill.
Economy Novelty Co., New York, N. Y.
Fibre Cord Co., New York, N. Y.
Freydberg Bros.-Strauss, Inc., New York, N. Y.

TAGS

(Informative Labeling)

Bradner Smith & Co., Chicago, Ill.
Cameo Die & Label Co., New York, N. Y.
Cupples-Hesse Corp., St. Louis, Mo.
Dennison Mfg. Co., Framingham, Mass.
Economy Novelty Co., New York, N. Y.
Fox, C. J. Co., The, Providence, R. I.
Kaumagraph Co., Wilmington, Del.
Pollock Paper & Box Co., Dallas, Tex.
Reyburn Mfg. Co., Inc., The, Phila., Pa.
Robinson Tag & Label Co., New York, N. Y.
Salisbury Mfg. Co., Central Falls, R. I.
Tablet & Ticket Co., The, Chicago, Ill.

TAPE, CELLULOSE

Crystal Transparent Mfg. Co., Inc., New York, N. Y.
Dennison Mfg. Co., Framingham, Mass.
Food Packaging Div. of Milprint, Inc., Milwaukee, Wis.
Industrial Tape Corp., New Brunswick, N. J.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Sylvania Industrial Corp., New York, N. Y.

TAPE, COTTON

Chicago Printed String Co., Chicago, Ill.
Freydberg Bros.-Strauss, Inc., New York, N. Y.

TAPE, GUMMED

Central Paper Co., Menasha, Wis.
Chicago Gum Tape Co., Chicago, Ill.
Crowell Corp., The, Yorklyn, Del.
Crown Zellerbach Corp., San Francisco, Calif.
Dennison Mfg. Co., Framingham, Mass.
Economy Novelty Co., New York, N. Y.

Ever Ready Label Corp., New York, N. Y.
Fort Wayne Corrugated Paper Co., Fort Wayne, Ind.
Gates Paper Co. Ltd., The, Los Angeles, Calif.
Gummed Products Co., The, Troy, Ohio
Gummed Tape & Devices Co., Bklyn, N. Y.
Inland Container Corp., Indianapolis, Ind.
Knowlton, M. D. Co., Rochester, N. Y.
McLaurin-Jones Co., Brookfield, Mass.
Mid-States Gummed Paper Co., Chicago, Ill.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
Nashua Package Sealing Co., Inc., Nashua, N. H.
Pollock Paper & Box Co., Dallas, Tex.
Rexford Paper Co., Milwaukee, Wis.
Reyburn Mfg. Co., Inc., The, Phila., Pa.

TIN PLATE

Bethlehem Steel Corp., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Can Corp., New York, N. Y.
Republic Steel Corp., Cleveland, Ohio

TRANSPARENT MATERIALS, CELLOPHANE

du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Sylvania Industrial Corp., New York, N. Y.

TRANSPARENT MATERIALS, CELLULOSE ACETATE

American Products Mfg. Co., New Orleans, La.
Celanese Celluloid Corp., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Eastman Kodak Co., Rochester, N. Y.
Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Nixon Nitration Works, Nixon, N. J.

TRANSPARENT MATERIALS, CONVERTERS OF RIGID CELLULOSIC SHEET

Acme Paper Box Co., Chicago, Ill.
Alderman Paper Box Corp., Rochester, N. Y.
Allvue Container Corp., Bklyn, N. Y.
Apex Paper Box Corp., Chicago, Ill.
Arrow Mfg. Co., Hoboken, N. J.
Athol Paper Box Co., Athol, Mass.
Atlanta Box Factory, Atlanta, Ga.
Atlantic Paper Box Co., Boston, Mass.
Autokraft Box Co., Hanover, Pa.
Babcock Box Co., Attleboro, Mass.
Barger Box Co., Inc., Elkhart, Ind.
Benton Harbor Mfg. Co., Benton Harbor, Mich.
Bisler, G. A. Inc., Phila., Pa.
Box Novelties, Inc., New York, N. Y.
Box Shop, Inc., New Haven, Conn.
Bronzart Metals Co., New York, N. Y.
Buckley, C. E. Co., Leominster, Mass.
Buedingen, Wm. & Son, Rochester, N. Y.
Burt, F. N. Co., Inc., Buffalo, N. Y.
Cambridge Paper Box Co., Cambridge, Mass.
Casco Paper Box Co., Inc., Portland, Me.
Celanese Celluloid Corp., New York, N. Y.
Cellulose Packaging Corp., New York, N. Y.
Central States Paper & Bag Co., Inc., St. Louis, Mo.
Clark, Geo. V. Co., Inc., Long Island City, N. Y.
Cleveland Container Corp., Cleveland, Ohio
Clover Paper & Transparent Boxes, Inc., Long Island City, N. Y.

Cournand, E. L. Inc., New York, N. Y.
Craftsman Label Co., New York, N. Y.
Crook Paper Box Co., Kansas City, Mo.
Dennison Mfg. Co., Framingham, Mass.
Design Center, Inc., New York, N. Y.
Dickerman Box Co., Cambridge, Mass.
Dorfman, A. & Co., Inc., New York, N. Y.
Earlville Paper Box Co., Earlville, N. Y.
Eggers O'Flyng Co., Omaha, Nebr.
Embee Transparent Specialty Co., New York, N. Y.

Everett Transparent Container Co., New York, N. Y.
Fairchild, E. E. Corp., Rochester, N. Y.
Fleishhacker Paper Box Co., San Francisco, Calif.
Flower City Specialty Co., Rochester, N. Y.
Forbes Lithograph Co., The, Boston, Mass.
Friend Box Co., Danvers, Mass.
Frost Box Co., Inc., Pawtucket, R. I.
Glove Paper Box Co., Chicago, Ill.
Harvard Specialty Mfg. Corp., Cambridge, Mass.

Henry, Ira L. Co., Watertown, Wis.
High Point Paper Box Co., High Point, N. C.
Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
Howell, F. M. & Co., Elmira, N. Y.
Hygienol Co., New York, N. Y.
Humitube Mfg. Co., Peoria, Ill.
J. L. Paper Box Co., Attleboro, Mass.
Kellogg, P. P. Co., Div. U. S. Envelope Co., Springfield, Mass.

Landowne, J. Co., The, Bklyn, N. Y.
Lebanon Paper Box Co., Lebanon, Pa.
Leominster Paper Box Co., Leominster, Mass.

Lorscheider-Schang Co., Rochester, N. Y.
Mason Box Co., The, Attleboro Falls, Mass.
Meier, Joshua, New York, N. Y.
Menasha Products Co., The, Menasha, Wis.

Merrick Transparent Products, Long Island City, N. Y.

Meyer, Frank C. Co., Bklyn, N. Y.
Meyer, Jos. H. Bros., Bklyn, N. Y.
Miller, Walter P. Co., Inc., Phila., Pa.
Nashua Gummed & Coated Paper Co., Nashua, N. H.
National Transparent Box Co., Springfield, Mass.

Neostyle, Inc., Chicago, Ill.
Nicoll & Co., San Francisco, Calif.
Old Dominion Box Co., Inc., Charlotte, N. C.

Parfait Powder Puff Co., Chicago, Ill.
Paper Package Co., Indianapolis, Ind.
Pederson Mfg. Co., Los Angeles, Calif.
Pilliod Cabinet Co., The, Swanton, Ohio
Plumly, Geo. W. Co., Phila., Pa.
Price, M. B. Associates, New York, N. Y.
Printloid, Inc., New York, N. Y.
Reynolds Spring Co., Molded Plastics Div., Cambridge, Ohio

Ritchie, W. C. & Co., Chicago, Ill.
Robinson, A. E. & Co., Chicago, Ill.
Royal Paper Corp., New York, N. Y.
Schleicher, F. J. Paper Box Co., St. Louis, Mo.

Schulz, A. Geo. Co., Milwaukee, Wis.
Schunack, C. E. Inc., Meriden, Conn.
Seaman Box Co., Inc., New York, N. Y.
Shaw Paper Box Co., Meriden, Conn.
Shoup-Owens, Inc., Hoboken, N. J.
Siegel, A. L. Co., Inc., Newark, N. J.
Sillocks-Miller Co., The, South Orange, N. J.

Stecker Paper Box Co., Detroit, Mich.
Stein, A. & Co., Inc., Chicago, Ill.
Taylor Box Co., Providence, R. I.
Tower Envelope Co., New York, N. Y.
Transparent Specialties Corp., Cleveland, Ohio

Traver Corp., Chicago, Ill.
Union Specialty Co., Plainfield, N. J.
U. S. Envelope Co., Springfield, Mass.
U. S. Finishing & Mfg. Co., Chicago, Ill.
Walco Plastics, E. Orange, N. J.
Wallace Paper Box Corp., New York, N. Y.

Addresses of companies listed appear on pages 622-630

Warneke Paper Box Co., Denver, Colo.
Warner Bros. Co., The, Bridgeport, Conn.
Waterbury Paper Box Co., Inc., Waterbury, Conn.

Weinman Bros., Chicago, Ill.
Williams Bros., St. Joseph, Mich.
Young, Douglas Inc., Pawtucket, R. I.
Young, Everett F. Co., Providence, R. I.
Zumbiel, C. W. Co., Cincinnati, Ohio

TRANSPARENT MATERIALS, CONVERTERS OF TRANSPARENT FILM

American Paper Goods Co., The, Kensington, Conn.
Andrews, P. L. Corp., Bklyn, N. Y.
Arvey Corp., Chicago, Ill.
Cellulose Packaging Corp., New York, N. Y.
Comet Envelope & Paper Co., Inc., New York, N. Y.
Continental Bag Specialties Corp., New York, N. Y.
Crystal Transparent Mfg. Co., Inc., New York, N. Y.
Crystal Tube Mfg. Co., Chicago, Ill.
Cupples-Hesse Corp., St. Louis, Mo.
Daniels Mfg. Co., Rhinelander, Wis.
Dobackmun Co., The, Cleveland, Ohio
Forbes Lithograph Co., The, Boston, Mass.
Freyberg Bros.-Strauss, Inc., New York, N. Y.
General Laminating, Inc., New York, N. Y.
Interstate Folding Box Co., Middletown, Ohio
Ivers-Lee Co., Newark, N. J.
Marvellum Co., The, Holyoke, Mass.
Mason Envelope Co., New York, N. Y.
Matthias Paper Corp., Phila., Pa.
Menasha Products Co., The, Menasha, Wis.
Milprint, Inc., Milwaukee, Wis.
Mor-Gan Laminating & Foliating Co., New York, N. Y.
Munson Bag Co., The, Cleveland, Ohio
National Transparent Box Co., Springfield, Mass.
Neostyle Inc., Chicago, Ill.
Nicoll & Co., San Francisco, Calif.
Oneida Paper Prods., Inc., New York, N. Y.
Paramount Paper Products Co., Inc., Phila., Pa.
Pie-Pak Co., Inc., Hoboken, N. J.
Plastics Finishing Corp., Bklyn, N. Y.
Pollock Paper & Box Co., Dallas, Tex.
Print-A-Tube Co., Passaic, N. J.
Royal Paper Corp., New York, N. Y.
Royal, Thomas M. & Co., Phila., Pa.
Shellmar Products Co., Mt. Vernon, Ohio
Tower Envelope Co., New York, N. Y.
Transparent Specialties Corp., Cleveland, Ohio
Traver Corp., Chicago, Ill.
U. S. Envelope Co., Springfield, Mass.

TRANSPARENT MATERIALS, ETHYL CELLULOSE

American Prods. Mfg. Co., New Orleans, La.
Celanese Celluloid Corp., New York, N. Y.
Dow Chemical Co., The, Midland, Mich.

TRANSPARENT MATERIALS, GLASSINE

Glassine Paper Co., Conshohocken, Pa.
Newark Paraffine & Parchment Paper Co., Newark, N. J.
Port Huron Sulphite & Paper Co., Port Huron, Wis.
Rhinelander Paper Co., Rhinelander, Wis.
Riegel Paper Corp., New York, N. Y.
Southern Waxed Papers Co., Atlanta, Ga.
Specialty Papers Co., Dayton, Ohio
Twitchell, E. W. Inc., Phila., Pa.
Westfield River Paper Co., Inc., Russell, Mass.

TRANSPARENT MATERIALS, LATEX FOR WRAPPING FROZEN FOODS

Dewey & Almy Chemical Co., Cambridge B, Mass.

TRANSPARENT MATERIALS, RUBBER HYDROCHLORIDE

American Products Mfg. Co., New Orleans, La.
Dispersions Process, Inc., New York, N. Y.
du Pont de Nemours, E. I. & Co., Inc., Wilmington, Del.
Goodyear Tire & Rubber Co., The, Pliofilm Div., Akron, Ohio

TRANSPARENT MATERIALS, VINYL ACETATE

Carbide & Carbon Chemicals Corp., New York, N. Y.
Monsanto Chemical Co., Springfield, Mass.

TUBE CLIPS

Colton, Arthur Co., Detroit, Mich.
Standard Specialty & Tube Co., New Brighton, Pa.

TUBES, CELLULOSE

See Vials, Cellulose

TUBES, COLLAPSIBLE

(Aluminum, Lead, Tin & Alloys)

Aluminum Co. of America, Pittsburgh, Pa.
National Collapsible Tube Co., Providence, R. I.
New England Collapsible Tube Co., Chicago, Ill.
Peerless Tube Co., Bloomfield, N. J.
Standard Specialty & Tube Co., New Brighton, Pa.
Sun Tube Corp., Hillside, N. J.
Turner White Metal Co., Inc., New Brunswick, N. J.
Victor Metal Products Corp., Bklyn, N. Y.
White Metal Mfg. Co., Hoboken, N. J.
Wirz, A. H. Inc., Chester, Pa.

TUBES, COLLAPSIBLE (PLASTIC)

Celluplastic Corp., Newark, N. Y.
Firestone Rubber & Latex Prods. Co., Fall River, Mass.
Mills, Elmer E. Corp., Chicago, Ill.

TUBES, PNEUMATIC DISPATCH

Lamson Corp., Syracuse, N. Y.

TUBING, GLASS

See Glass, Rod & Tubing

TUMBLERS

(Glass)

Anchor Hocking Glass Corp., Lancaster, Ohio
Ball Bros. Co., Muncie, Ind.
Corning Glass Works, Corning, N. Y.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Libby Glass Mfg. Co., Toledo, Ohio
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Tygart Valley Glass Co., Washington, Pa.

VARNISHES & LACQUERS

See Coatings, Protective

VIALS, CELLULOSE

Celluplastic Corp., Newark, N. J.
Lusteroid Container Co., Inc., S. Orange, N. J.

VIALS, GLASS

Glass Industries, Inc., New York, N. Y.
Hazel-Atlas Glass Co., Wheeling, W. Va.
Kimble Glass Co., Vineland, N. J.
Owens-Illinois Glass Co., Toledo, Ohio
Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Pennsylvania Glass Products Co., Pittsburgh, Pa.
Price, M. B. Associates, New York, N. Y.
Wheaton, T. C. Co., Millville, N. J.

VIALS, METAL

Aluminum Container Corp., Fulton, N. Y.
American Aluminum Ware Co., Newark N. J.
Clark, J. L. Mfg. Co., Rockford, Ill.
Sun Tube Corp., Hillside, N. J.
Victor Metal Products Corp., Bklyn, N. Y.

WADDING

See Padding & Wadding

WIRE, REINFORCEMENT

Acme Steel Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Gerrard Co., Inc., The, Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

WIRE, STAPLING

Acme Staple Co., Camden, N. J.
Acme Steel Co., Chicago, Ill.
Bates Mfg. Co., The, New York, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Bostitch, Inc., East Greenwich, R. I.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
International Staple & Machine Co., Clifton Heights, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Paslode Co., Chicago, Ill.
Prentiss, George W. & Co., Holyoke, Mass.

WIRE, STITCHING

Acme Steel Co., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Bostitch, Inc., East Greenwich, R. I.
Dexter Folder Co., Pearl River, N. Y.
Harris-Seybold-Potter Co., Dayton, Ohio
Heller Co., The, Cleveland, Ohio
Ideal Stitcher & Mfg. Co., Racine, Wis.
International Staple & Machine Co., Clifton Heights, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Paslode Co., Chicago, Ill.
Prentiss, George W. & Co., Holyoke, Mass.

WIRE, STITCHING, COLORED

Acme Steel Co., Chicago, Ill.
Bostitch, Inc., East Greenwich, R. I.
Harris-Seybold-Potter Co., Dayton, Ohio

WRAPPERS, BOTTLE

Hinde & Dauch Paper Co., Sandusky, Ohio

Directory of Trade Names

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
ACJ	Adhesives, starch derived	Stein, Hall Mfg. Co., Chicago, Ill.
A.C.M.	Box board, folding and display containers	American Coating Mills, Inc., Elkhart, Ind.
Abk	Plastic floor truck wheels	The Rapids-Standard Co., Inc., Grand Rapids, Mich.
Accent	Manicure sets	The Henkel Co., Fremont, O.
Ace	Steel strapping tightener	Stanley Works, New Britain, Conn.
Acetate Face	Bag with acetate film front and glassine back	Mason Envelope Co., New York, N. Y.
Ace-Tra	One-piece capsule metal tray	Ace Carton Corp., Cicero, Ill.
Acme	Machines	Acme Staple Co., Camden, N. J.
Adamant	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Addowlight	Automatic indicating, totalizing and counting scale	Merrick Scale Mfg. Co., Passaic, N. J.
Aeromatic	Automatic scales	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Agate Dipping	For chocolate coating	Mathias Paper Corp., Phila., Pa.
Alco	Composition, cold molded	American Insulator Corp., New Freedom, Pa.
Air-Flo	Bottle cleaning and filling machine	Karl Kiefer Machine Co., Cincinnati, O.
Air Insulated	Featherweight molded containers	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Air Line	Jar cleaning machine	Karl Kiefer Machine Co., Cincinnati, O.
Air-O-Seal	Cellophane covered coffee bag	Thomas M. Royal & Co., Phila., Pa.
Ajax Glaze	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Alcoa	Aluminum Company of America products	Aluminum Company of America, Pittsburgh, Pa.
Allison	Bag closing machine	B. F. Gump Co., Chicago, Ill.
Allure	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
All-Weather	Weatherproofed displays for outdoor use	Badger Merchandising Displays, Inc., Milwaukee, Wis.
All-Weather	Water resistant kraft	Bagpak, Inc., New York, N. Y.
Alisco	Aluminum Seal Co. products	Aluminum Seal Co., New Kensington, Pa.
Alter-Proof	Tear-off band tamperproof	Aluminum Seal Co., New Kensington, Pa.
Aluminite	Aluminum-coated papers and board	Keller-Dorian Corp., New York, N. Y.
Alvac	Vacuum tumbler closure	Aluminum Seal Co., New Kensington, Pa.
Amekins	Synthetic rubber dropper nipples	Pennsylvania Glass Products Co., Pittsburgh, Pa.
Ameritan	Paper, box lace	American Lace Paper Co., Milwaukee, Wis.
American Beauty	Box cover paper	C. R. Whiting Co., Inc., Hackensack, N. J.
American Prints	Fancy printed, patriotic	Louis Dejonge & Co., New York, N. Y.
Amerine	Composition, cold molded	American Insulator Corp., New Freedom, Pa.
Ameroid	Casein	American Plastics Corp., New York, N. Y.
Amerseal	Lug caps	Anchor Hocking Glass Corp., Lancaster, O.
Amerseal	Special pouring spout with screw cap closure	Continental Can Co., New York, N. Y.
Amkleer	Cellophane bags	American Paper Goods Co., Kensington, Conn.
Ampaco	Cellophane envelopes	H. Fleisig, Inc., New York, N. Y.
Amphenol	Paper mailing boxes	American Phenolic Corp., Chicago, Ill.
Amprinko	Printing inks	American Printing Ink Co., Div. General Printing Ink Corp., Chicago, Ill.
Amso	Bag sealer	Amso Packaging Machinery Co., L. I. C., N. Y.
Amyloid	Coated starch sheeting	American Products Mfg. Co., New Orleans, La.
Anchor	Metal and molded closures, sealing machines, processing equipment	Anchor Hocking Glass Corp., Lancaster, O.
Anchor	Steel strapping	Signode Steel Strapping Co., Chicago, Ill.
Anchor Hocking	Glass tumblers, jars, bottles, metal and molded closures, Sealing Machines	Anchor Hocking Glass Corp., Lancaster, O.
Androck	Wire display fixtures, floor and counter types	Washburn Co., Rockford, Ill.
Angle-Loc	Folding box for baked goods	The Ohio Boxboard Co., Rittman, O.
Anilink	Aniline ink, dye or pigmented type	Rotogravure Div., General Printing Ink Corp., New York, N. Y.
Anilink Kleensolve	Solvent, cleaning, for knurled rollers	Rotogravure Div., General Printing Ink Corp., New York, N. Y.
Apex	Steel strapping	Signode Steel Strapping Co., Chicago, Ill.
Aqueleen	Transparent greaseproof papers	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Aquapearl	Cast phenolic pearl shades	Catalin Corp., New York, N. Y.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Aqua-Seal	Moisture resistant boxboard	The Ohio Boxboard Co., Rittman, O.
Arabol	Adhesive	Arabol Mfg. Co., New York, N. Y.
Araflex	Adhesive	Arabol Mfg. Co., New York, N. Y.
Aratex	Adhesive	Arabol Mfg. Co., New York, N. Y.
Arengo	Packaging machines	Arengo Machine Co., Inc., New York, N. Y.
Argent Silver Print	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Argette	Box paper	Kupfer Bros. Co., New York, N. Y.
Aristo	Confectionery bags	American Paper Goods Co., Kensington, Conn.
Aristocrat	Folding paper boxes	Edwin J. Schoettl Co., Phila., Pa.
Aristocrat	Wax-lined food tray	Sutherland Paper Co., Kalamazoo, Mich.
Aristokraft	Cellophane garment bags	Central States Paper & Bag Co., St. Louis, Mo.
Arkase	Crinkled kraft linings for bags, barrels, drums and boxes. Crinkled paper in rolls and sheets	Arkell Safety Bag Co., New York, N. Y.
Artboxtone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Artcote	Pyroxilin metallic coated papers	Artcote Papers, Inc., Irvington, N. J.
Art-Craft	Fancy embossed paper	Springfield Coated Paper Corp., Camden, N. J.
Artex	Leather substitute paper	Bradner Smith & Co., Chicago, Ill.
Art Finished Pastels	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Art Floral	Brightwood kid finish papers	Holyoke Card & Paper Co., Springfield, Mass.
Art Gingham	Brightwood kid finish papers	Holyoke Card & Paper Co., Springfield, Mass.
Artillery	Box cover	District of Columbia Paper Mills, Inc., Washington, D.C.
Artimold	Molded plastic caps	Armstrong Cork Co., Lancaster, Pa.
Art Pastels	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Art Pockets	Folders with eyelet and long fasteners	Henry Schmidt & Bro., Inc., Phila., Pa.
Ashmaster	Ash tray	Owens-Illinois Glass Co., Toledo, O.
Asphaltite	Board impregnated with odorless asphaltum	National Container Corp., Long Island City, N. Y.
Athos	Cover paper	United Mfg. Co., Springfield, Mass.
Atlasol	Pastes and glues	Atlas Gum & Sizing Co., New York, N. Y.
Aulcoid	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Aulflex	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Aulspar	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Aultone	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Autoclench	Stapler	Bostitch, Inc., East Greenwich, R. I.
Autofoil	Roll leaf	Coughlin Mfg. Co., New York, N. Y.
Autokrat	Collapsible paper boxes	Edwin J. Schoettl Co., Phila., Pa.
B-M Wrap	Moistureproof wrapping	Plastic Coating Corp., Holyoke, Mass.
"B" Brand	Tin cans and closing machines	National Can Corp., New York, N. Y.
Baby Bunting	Nursery sets	Owens-Illinois Glass Co., Toledo, O.
Babytone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Bagpak	Multi-wall paper bag filling and closing equipment	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Bagpak	Bag filling and closing machinery	Bagpak, Inc., New York, N. Y.
Bakelite	Acetate, phenolic, polystyrene, urea, molding materials; also cast resins	Bakelite Corp., New York, N. Y.
Ballyhoo	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Bandbox Stripes	Printed papers, fancy	Louis Dejonge & Co., New York, N. Y.
Barkstone	Imitation cork box covers	District of Columbia Paper Mills, Inc., Washington, D.C.
Bar-Nun	Bag feeders, openers, weighers and closers	B. F. Gump Co., Chicago, Ill.
Bar-Nun Auto Check	Automatic net weighers	B. F. Gump Co., Chicago, Ill.
Barque	Print box paper	The Marvellum Co., Holyoke, Mass.
Bar-Kap	Bar use caps	Aluminum Seal Co., New Kensington, Pa.
Barroll Nozzle	Special nozzle with screw closure	Continental Can Co., New York, N. Y.

Complete addresses of companies listed appear on pages 622-630

PACKAGING CATALOG

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TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Bas Relief	Gold and silver topped embossed paper	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Beacon	Inturned lug caps	Anchor Hocking Glass Corp., Lancaster, O.
Beauty Kit	Travel kit	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Beau Tye	Decorative tying ribbon made of cotton	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Seauwood	Decorative paper	Hazen Paper Co., Holyoke, Mass.
Bedford Cord	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Beetle	Urea-formaldehyde plastic	American Cyanamid Co., Plastics Div., New York, N. Y.
Bells and Stars	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Bendall	Attachment for steel rule bender	J. F. Helmold & Bro., Inc., Chicago, Ill.
Ben Mont	Gift wrappings, tissues, glassine bags, shredded waxed papers	Ben Mont Papers, Inc., Bennington, Vt.
Ben Mont Master-craft	Gift wrappings, tissues, glassine bags, shredded waxed papers	Ben Mont Papers, Inc., Bennington, Vt.
Bergmann	Conveyor switches	Horix Mfg. Co., Pittsburgh (4), Pa.
Bethcollite	Ice cream fillers	Bethlehem Steel Co., Bethlehem, Pa.
Big Chief	Glass bottles	Owens-Illinois Glass Co., Toledo, O.
Birch	Box cover	District of Columbia Paper Mills, Inc., Washington, D.C.
Birchette	Box paper	Kupfer Bros. Co., New York, N. Y.
Blackbird Embossed	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Blacktone	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Blanchette	Box paper	Kupfer Bros. Co., New York, N. Y.
Bliss	Wire stitchers	Dexter Folder Co., New York, N. Y.
Bliss	Solid fibre shipping containers	Robert Gair Co., Inc., New York, N. Y.
Block Board	Heavy pressed board signs	Chaspec Mfg. Co., New York, N. Y.
Blossomtime	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Blue-Kore	Gummed cloth tape	The Gummed Products Co., Troy, O.
Blum	Testing machines	The Labotex Co., Inc., Cincinnati, O.
Bond	Gross weighing and filling machines (dry)	U. S. Automatic Box Machinery Co., Inc., Rosindale, Boston, Mass.
Bond-Crowns	Crowns for beverage bottles and cans	Bond Mfg. Corp., Inc., Wilmington, Del.
Boosters	Portable belt conveyors	The Rapids-Standard Co., Inc. Grand Rapids, Mich.
Bo-Seals	Pre-tied, cellulose bows	Stark Bros. Ribbon Corp., New York, N. Y.
Bostitch	Wire staples, staplers, stitchers, tackers	Bostitch, Inc., East Greenwich, R. I.
Boston	Wire stitchers	Dexter Folder Co., New York, N. Y.
Bouquet	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Boxcrafters	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Brad-Tite	Specialty wrappers for bread and food	Dixie Wax Paper Co., Inc., Dallas, Texas
Brazilian Bright	Nature papers	Bradner Smith & Co., Chicago, Ill.
Brighten Leaf	Roll leaf	Griffin, Campbell, Hayes, Walsh, Inc., New York, N. Y.
Bright Spots	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Brightwood	Box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Brightwood	Paper box making machine	U. S. Automatic Box Machinery Co., Inc., Boston, Mass.
Brightwood Cameo	Box cover paper	Holyoke Card & Paper Co., Springfield, Mass.
Brightwood Polychrome	Box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Brightwood Saleens	Box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Brilliant Metallics	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Britecote	Paper stock	Brooks Bank Note Co., Springfield, Mass.
Broadside	Folding carton	Robert Gair Co., Inc., New York, N. Y.
Brocade	Printed embossed paper	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Broken Back	Patented display container	Brooks Bank Note Co., Springfield, Mass.
Bronzart	Counter and window displays and point of sale material	Bronzart Metals Co., New York, N. Y.
Bronzoid	Embossed signs	Chaspec Mfg. Co., New York, N. Y.
Brooks Twin	Double unit display container	Brooks Bank Note Co., Springfield, Mass.
Brownie	Beer bottle (glass)	Brockway Glass Co., Inc., Brockway, Pa.
Bruno	Semi-automatic can filling machine	The Vol-U-Meter Co., Buffalo, N. Y.
Brunswick	Paper for box coverings	Pejenscot Paper Co., New York, N. Y.
Buckskin	Kraft lined boxes	Morris Paper Mills, Chicago, Ill.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Bulken	For shipment up to 5 gal. Collapsible	Sealright Co., Inc., Fulton, N. Y.
Bulkbinding	Steel strapping	Signode Steel Strapping Co., Chicago, Ill.
Bulk-Flo	Elevator-conveyor-feeder	Link Belt Co., Chicago, Ill.
Bunn	Tying machines	B. H. Bunn Co., Chicago, Ill.
Burlabox	Export water resistant containers	National Container Corp., Long Island City, N. Y.
Burt	Labeling and case packing machines	Burt Machine Co., Baltimore, Md.
C. M. C.	Cartoning machinery	U. S. Automatic Box Machinery Co., Inc., Boston, Mass.
CT	Continuous thread screw caps	Phoenix Metal Cap Co., Chicago, Ill.
C & D	Junior case printer	Ideal Stitcher & Mfg. Co., Racine, Wis.
C-255-Glu-Weld	Waterproof glue	F. G. Findley Co., Milwaukee, Wis.
Camachine	Slitting, winding and laminating machines	Cameron Machine Co., Bklyn, N. Y.
Camel Brand	Corrugated containers	The Ashtabula Corrugated Box Co., Ashtabula, O.
Cameo-Cut	Cut out letters, ornament signatures	Cameo Die & Label Co., New York, N. Y.
Cameoflex	Iridescent label printing process	Cameo Die & Label Co., New York, N. Y.
Cameo-Shine	Substitute for aluminum foil	Cameo Die & Label Co., New York, N. Y.
Cameron	Can making machinery	Cameron Can Machinery Co., Chicago, Ill.
Camlet	Two-tone embossed paper	Springfield Coated Paper Corp., Camden, N. J.
Canco	Miscellaneous tin cans and containers	American Can Co., New York, N. Y.
Candy Stripes	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Canno	Belt conveyor	Karl Kiefer Machine Co., Cincinnati, O.
Canvas	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
CaPeM	Screw capping machines	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Captive Cap	Collapsible tube	National Collapsible Tube Co., Providence, R. I.
Carbofilm	Coated wood gum sheeting	American Products Mfg. Co., New Orleans, La.
Carnival	Embossed foil box papers	Hazen Paper Co., Holyoke, Mass.
Carpenter	Fibre drums	Carpenter Container Co., Inc., Bklyn, N. Y.
Carry-Safe	Egg carton	Self-Locking Carton Co., Chicago, Ill.
Casual	Closure	Owens-Illinois Glass Co., Toledo, O.
Catabond	Phenolic laminating	Catalin Corp., New York, N. Y.
Catalin	Cast phenolic plastic	Catalin Corp., New York, N. Y.
Catavar	Phenolic surface coating	Catalin Corp., New York, N. Y.
CCS	Crown corks	Crown Cork & Seal Co., Baltimore, Md.
Ceco	Carton and container sealing machines	Container Equipment Corp., Newark, N. J.
Cedar	Woodgrain box papers	Hazen Paper Co., Holyoke, Mass.
Celate	Opaque, transparent, and translucent cellulose acetate in colors	E. L. Courmand, Inc., New York, N. Y.
Cello	Cellophane ribbon	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Cello-Face	Bag with cellophane front and glassine back	Mason Envelope Co., New York, N. Y.
Cellophane	Transparent cellulose sheeting	E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
Cellophane	Transparent cellulose sheeting	Sylvania Industrial Corp., New York, N. Y.
Cello-Safe	Cellophane lollipop sticks	Fineford Co., New York, N. Y.
Celloshen	Super-transparent glassine	Deerfield Glassine Co., Monroe Bridge, Mass.
Cell-U-Art	For packaging men's underwear, lingerie, candy, etc.	Traver Corp., Chicago, Ill.
Cellucolor	Wrappers	Shellmar Products Co., Mt. Vernon, O.
Cellu-Gums	Adhesives for gluing transparent sheeting	National Adhesives, Div. National Starch Products, Inc., New York, N. Y.
Cellulin	Wrappers	Shellmar Products Co., Mt. Vernon, O.
Celluloid	Cellulose nitrate (pyroxylin)	Celanese Celluloid Corp., New York, N. Y.
Celluplastic	Sheet-formed acetate vial and tubes	Celluplastic Corp., Newark, N. J.
Cell-U-Print	Varnished bags	Thomas M. Royal & Co., Phila., Pa.
Cellusuede	Flock paper	Stevens-Nelson Paper Corp., New York, N. Y.
Cellusuede	Velour paper	Cellusuede Products, Inc., Rockford, Ill.
Celolustre	Box coating	National Metal Edge Box Co., Phila., Pa.
Celonite	Cellulose nitrate plastic sheeting	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Celons	Secondary bottle closures	Celon Co., Madison, Wis.
Cel-O-Seal	Cellulose caps and bands	Armstrong Cork Co., Lancaster, Pa.
Celoshine	Waxed glassine bags with window	E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Celowax	Waxed sulphite	Riegel Paper Corp., New York, N. Y.
Cel-Spar	Box covering papers	Paper City Mfg. Co., Inc., Holyoke, Mass.
Cem	Bottling machinery	The Crown Cork & Seal Co., Baltimore, Md.
Cemac	Bottling machinery	The Crown Cork & Seal Co., Baltimore, Md.
Cemco	Bottling machinery	The Crown Cork & Seal Co., Baltimore, Md.
Century	Carton gluer	E. G. Staude Mfg. Co., St. Paul, Minn.
Certified	Paper doilies	U. S. Lace Paper Works, Inc., Bklyn, N. Y.
Challenger	Cellulose window gluing machine	E. G. Staude Mfg. Co., St. Paul, Minn.
Challis Print	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Chambon	Typographic printing presses	Champlain Div., Interchemical Corp., New York, N. Y.
Chameleon	Leatherette paper	Springfield Coated Paper Corp., Camden, N. J.
Champion	Envelope mfg. machine	F. L. Smith Machine Co., Inc., New York, N. Y.
Champion	Adjustable shell making machine	E. G. Staude Mfg. Co., St. Paul, Minn.
Champlain	Roll fed rotogravure printing equipment	Champlain Div., Interchemical Corp., New York, N. Y.
Chastik	Adhesive backing	Chaspec Mfg. Co., Inc., New York, N. Y.
Chatoye	Pyroxylin treated box papers	Plastic Coating Corp., Holyoke, Mass.
Check-Weigher	Automatic check-weighing scale	Merrick Scale Mfg. Co., Passaic, N. J.
Cheerio	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Chemco Lac	Quick drying varnish	Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Chemco Lightning Set	Ink compound	Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Chemco Wax	Ink compound	Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Chest Craft	Anti-tarnish silverware chests	Leominster Paper Box Co., Leominster, Mass.
Cheviot	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Chevron Print	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Chick Pullman	Corrugated chick shipping containers	Inland Container Corp., Indianapolis, Ind.
Chilton	Metal inlaying in plastics	Plastic Inlays, Inc., Summit, N. J.
Christmas Candle	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Christmas Ribbons	Fancy printed paper	Louis Dejonge & Co., New York, N. Y.
Cinati	Liquid bottling machine	Karl Kiefer Machine Co., Cincinnati, O.
Cinati Junior	Liquid bottling machine	Karl Kiefer Machine Co., Cincinnati, O.
Cin-Made	Fibre cans	The Cin-Made Corp., Cincinnati, O.
Circle "A"	Molded and metal caps and corks and glass containers	Armstrong Cork Co., Lancaster, Pa.
Citrusnap	Steel strapping	Acme Steel Co., Chicago, Ill.
Clargum	Liquid glue for labeling bottles	Clark Stek-O Corp., Rochester, N. Y.
Clarophone	Window bag	Oneida Paper Products, Inc., New York, N. Y.; also Continental Bag Specialties Corp., New York, N. Y.
Clarpic	Pick-up glue for labeling cans	Clark Stek-O Corp., Rochester, N. Y.
Clarkseal	Liquid glue for sealing cases	Clark Stek-O Corp., Rochester, N. Y.
Clarlab	Ready mixed for general adhesive purposes	Scientific Filter Co., New York, N. Y.
Clearit	Asbestos	Hartford City Paper Co., Hartford City, Ind.
Clearseal	Heat sealing glassine	General Laminating, Inc., New York, N. Y.
Clearseal	Thermoplastic coated acetate	Cellulastic Corp., Newark, N. J.
Clearita	Odorless unbreakable containers, Cellulose Butyrate and Acetate tubes and vials	Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Clearview	Cellophane bags	Cleveland Container Co., Cleveland, O.
Claveco	Lined fibre can	National Folding Box Co., New Haven, Conn.
Click-Top	Hinged cover box	The Hinde & Dauch Paper Co., Sandusky, O.
Climas	Bottle wrappers	Louis Dejonge & Co., New York, N. Y.
Coach and Four	Fancy paper	The Gardner-Richardson Co., Middletown, O.
Coated Lithwhite	Coated box board	New Jersey Machine Corp., Hoboken, N. J.
Code-O-Matic	For code or control number printing	Stein, Hall Mfg. Co., Chicago, Ill.
Collofilm	Adhesive	Shellmar Products Co., Mt. Vernon, O.
Colodense	Wrappers	Hazen Paper Co., Holyoke, Mass.
Coloisma	Pyroxylin coated metallic papers in brilliant colors	The Dobeckmun Co., Cleveland, O.
Colorettes	Printed cellophane flower pot wrappers	The Dobeckmun Co., Cleveland, O.
Colorfilm	Cellulose laminated coated paper	The U. S. Printing & Litho. Co., Cincinnati, O.
Colorgraphic	Transparent signs and calendars	

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Coloroid	Applied finishes to bottles and jars	Coloroid Co., Inc., Cleveland, O.
Coloroid	Applied colors to jars and bottles	Double Duty Products, Inc., Cleveland, O.
Color-Pak	Colored shipping containers and floor displays	The U. S. Corrugated-Fiber Box Co., Indianapolis, Ind.
Colortitch	Colored stapling and stitching wire	Acme Steel Co., Chicago, Ill.
Col-O-Tex	Imitation or artificial leather and display fabrics	Columbus Coated Fabrics Corp., Columbus, O.
Col-Tye	Cotton tips	Fibre Cord Co., New York, N. Y.
Colt Air	Insulated containers	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Colijems	Semi-precious stones (plastics)	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Colbrock	Phenol formaldehyde molding compound	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Coltwood	Phenol material	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Columbus	Overweight - underweight scales	The Exact Weight Scale Co., Columbus, Ohio
Comet	Sealing tapes	McLaurin-Jones Co., Brookfield, Mass.
Comel	Box stays	E. G. Staude Mfg. Co., St. Paul, Minn.
Commando	Out-folding carton gluer	Louis Dejonge & Co., New York, N. Y.
Common Sense	Protective paper	Owens-Illinois Glass Co., Toledo, O.
Complete Satinlone	Jars and bottles	Chas. W. Williams & Co., Inc., New York, N. Y.
Complimentary Print	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Concora	Box covering paper	Container Corp. of America, Chicago, Ill.
Congo	Linerboard and boxboard	Hazen Paper Co., Holyoke, Mass.
Conomee	Boxes and shipping cartons	Matthias Paper Corp., Philadelphia, Pa.
Conservettes	Box cover paper	The Dobeckmun Co., Cleveland, O.
Consolidated	Cellophane corsage containers	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Container Slotter	Textile bag closers	E. G. Staude Mfg. Co., St. Paul, Minn.
Conti-Chrome	Corrugated container slotter and creaser	Continental Lithograph Corp., Cleveland, O.
Conti-Glo	Screenless color reproductions	Continental Lithograph Corp., Cleveland, O.
Conti-Glo	Fluorescent lithographed displays	Continental Lithograph Corp., Cleveland, O.
Conti-Glo Line	Fluorescent lacquers and coatings	Continental Lithograph Corp., Cleveland, O.
Continental Gloss	Ultraviolet assemblies	Keller-Dorian Corp., New York, N. Y.
Cord-Sheen	Glossed and embossed printing papers	Hazen Paper Co., Holyoke, Mass.
Cordurette	Embossed mica paper	C. R. Whiting Co., Inc., Hackensack, N. J.
Corkrusa	Imitation cloth paper	C. R. Whiting Co., Inc., Hackensack, N. J.
Corktec	Imitation cork paper	Cork Affiliates Co., Inc., New York, N. Y.
Cork-Tex	Imitation cork	Bond Mfg. Corp., Inc., Wilmington, Del.
Corley-Miller	Cork products (discs, sheets, rods, slabs etc.)	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Corning Brand	Wrapping and sheeting machines	Corning Glass Works, Corning, N. Y.
Corodek	Glass rod and tubing and tumblers	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Corroflex	Colored corrugated liners and trays	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Corru-Fibre	Flexible corrugated for packing	J. M. Huber, Inc., New York, N. Y.
Corruflex	Printing inks	Waldorf Paper Products Co., St. Paul, Minn.
Corseal	Display packages	Aluminum Seal Co., New Kensington, Pa.
Colacord	Roll-on tamperproof over cork closure	Freyberg Bros.-Strauss, Inc., New York, N. Y.
Cottonluxe	Decorative tying cord—plastic covered	Cottonluxe Mfg. Co., New York, N. Y.
Cottrell-Heinrich	Anti-tarnish cotton-lined paper	H. H. Heinrich, Inc., New York, N. Y.
Counterboy	Multi-color aniline printing presses	Better Packages, Inc., Shelton Conn.
Counter Clerk	Case sealing machines (gummed tape)	Badger Merchandising Displays, Inc., Milwaukee, Wis.
Coverite	Counter merchandising displays	Sealright Co., Inc., Fulton, N. Y.
Cradle	Milk bottle closure	Owens-Illinois Glass Co., Toledo, O.
Crescent	Nursing bottles	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Cresco	Transparent waxed paper	Crescent Ink & Color Co. of Pa., Philadelphia, Pa.
Crestone	Printing inks	Crescent Ink & Color Co. of Pa., Philadelphia, Pa.
Crest-Sheen	Aniline ink	Hazen Paper Co., Holyoke, Mass.
Cretan-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Cretonne	Embossed mica paper	The Marvellum Co., Holyoke, Mass.
Crinkle-Tie	Fancy box-covering papers	Chicago Printed String Co., Chicago, Ill.
Crispeal	Cotton tying materials	Owens-Illinois Glass Co., Toledo, O.
Cross-Stitch	Closure	Hazen Paper Co., Holyoke, Mass.
Crown	Embossed mica paper	Crown Cork & Seal Co., Baltimore, Md.
Crown	Closures, caps, cans	The Robinson Clay Products Co., New York, N. Y.
Crown	Pottery	

Complete addresses of companies listed appear on pages 622-630

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS	TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Cry-O-Vac	Protective wrap for frozen foodstuffs	Dewey & Almy Chemical Co., Cambridge 8, Mass.	Double Duty	Wire-handle paper pail (locktop)	Sutherland Paper Co., Kalamazoo, Mich.
Cryptic	Printing inks	Crescent Ink & Color Co. of Pa., Phila., Pa.	Double Plate	Filter	Karl Kiefer Machine Co., Cincinnati, O.
Crystal	Asbestos	Scientific Filter Co., New York, N. Y.	Doubletone	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Crystal	Coated box coverings	McLaurin-Jones Co., Brookfield, Mass.	Doughboy	Rotary type hot krimp sealer	Pack-Rite Machine Corp., Milwaukee, Wis.
Crystallon	Mother-of-pearl box paper and cardboard	Riegel Paper Corp., New York, N. Y.	Dowicides	Germicides-fungicides	The Dow Chemical Co., Midland, Mich.
Crystal-Pak	Rigid cellulose containers	Transparent Specialties Mfg. Co., Cleveland, O.	Drawlene	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Crystalustre	Paper lacquer	Maas & Waldstein Co., Newark, N. J.	Dulcut	Syrup dispensers	Na-Mac Products Corp., Los Angeles, Calif.
Crystiphane	Transparent, thermoplastic paper	Newark Paraffine & Parchment Paper Co., Newark, N. J.	Dri-Tape	Heat-sealing	Seal, Inc., Shelton, Conn.
Cumberland	Box covering and printing	S. D. Warren Co., Boston, Mass.	Drumpak	Corrugated drums	Gaylord Container Corp., St. Louis, Mo.
Cuplette	Box paper	Kupfer Bros. Co., New York, N. Y.	Dry-Hastive	Masking tape	Gummed Tape & Devices Co., Bklyn, N. Y.
Cup-Paks	Paper drinking cups	Dixie-Vortex Co., Easton, Pa.	Dubl-Cushion	Egg carton	Bloomer Bros. Co., Newark, Wayne Co., N. Y.
Cushion Seitch	Siltproof and moistureproof bag closure	Bagpak, Inc., New York, N. Y.	Dubl-Vu	Cartons, window	Rossotti Lithographing Co., Inc., No. Bergen, N. J.
			Dukotone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
DL Krimpac	Semi-automatic packaging machine	Pack-Rite Machine Corp., Milwaukee, Wis.	Dullcoat	Suede mat coated papers	The Marvellum Co., Holyoke, Mass.
D-O-K	Waxed kraft paper	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.	Dullset	Inks	Geo. H. Morrill Co., Div. General Printing Ink Corp., New York, N. Y.
Decro	Metal milk bottle caps, coverall	Crown Cork & Seal Co., Baltimore, Md.	Dulseal	Gummed matted acetate sheeting	General Laminating, Inc., New York, N. Y.
Deka-Ware	Molded plastic containers, etc.	Henry Davies Molding Co., Chicago, Ill.	Dundee Fabrics	Box cover paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Damask	Embossed paper	Hampden Glazed Paper & Card Co., Holyoke, Mass.	Dundee Plaid	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Danagh	Counter displays	Robertson Paper Box Co., Inc., Montville, Conn.	Dunnflex	Gelatine glues	Thomas W. Dunn Co., New York, N. Y.
Dan-D-Pak	Printed transparent wraps	Daniels Mfg. Co., Rhineland, Wis.	Duo-Blo	Bottle and jar cleaning machine	Karl Kiefer Machine Co., Cincinnati, O.
Darex	Thermoplastic coating sealing compounds	Dewey & Almy Chemical Co., Cambridge 8, Mass.	Duo-Piston	Filling machine for viscous materials	Karl Kiefer Machine Co., Cincinnati, O.
D'Arleghan	Cover paper	United Mfg. Co., Springfield, Mass.	Duo-Seal	Custom lamination	C. B. Henschel Mfg. Co., Milwaukee, Wis.
Daysette	Box paper	Kupfer Bros. Co., New York, N. Y.	Duo-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Deco Baskets	Paper tills	Waldorf Paper Products Co., St. Paul, Minn.	Duplex	Labeling machines and accessories	Liquid Carbonic Corp., Chicago, Ill.
Deco Board	Decorated board	Waldorf Paper Products Co., St. Paul, Minn.	Duplex Duplex	Lug cap	National Seal Corp., Bklyn, N. Y.
Deco Boxes	Decorated boxes	Waldorf Paper Products Co., St. Paul, Minn.	Durafilm	Shipping-display boxes	The Hinde & Dauch Paper Co., Sandusky, O.
Decopad	Padding and decorative paper	Geo. H. Sweetnam, Inc., Cambridge, Mass.	Duraglas	Moisture-vaporproof cellulose film	The Dobeckmun Co., Cleveland, O.
Decouffe	Soda straw and toothpick wrapping machines	Arenco Machine Co., Inc., New York, N. Y.		Glass bottles, jars, containers	Owens-Illinois Glass Co., Toledo, O., also Owens-Illinois Pacific Coast Co., San Francisco, Calif.
Deerflex	Superclendered sulphite	Deerfield Glassine Co., Monroe Bridge, Mass.	Duranol	Transparent boxes	Joseph H. Meyer Bros., New York, N. Y.
Defender	Steel strapping	Signode Steel Strapping Co., Chicago, Ill.	Durapak	Advertising displays	Paterson Parchment Paper Co., Bristol, Pa.
Defoamer	Felt cleaners (for paper mfrs.)	Atlas Gum & Sizing Co., New York, N. Y.	Durelife	Insoluble paper for wet crate lining	Crescent Ink & Color Co. of Pa., Phila., Pa.
Deko-Art	Colored and embossed foil	Reynolds Metals Co., Richmond, Va.	Durewhite	Tin printing ink	Paper Package Co., Indianapolis, Ind.
Dellaseal	Bag with pouring spout	Bemis Bro. Bag Co., St. Louis, Mo.	Durez	Boxboard	Durez Plastics and Chemicals, Inc., N. Tonawanda, N. Y.
Dependon	Box stays	McLaurin-Jones Co., Brookfield, Mass.	Durite	Phenolic molding compounds	Durite Plastics, Phila., Pa.
Design Craft	Display sets—corrugated	Sherman Paper Products Corp., Newton Upper Falls, Mass.	Durmas	Phenol-furfural, phenol-formaldehyde heat-setting molding compositions	Boxes and boxboards
Detecto	Scales	Detecto Scales, Inc., Bklyn, N. Y.	Durmaskote	Coating, for boxboard	Sample-Durick Co., Inc., Indian Orchard, Mass.
Detecto-Gram	Scales	Detecto Scales, Inc., Bklyn, N. Y.	Du-Tone	Triple edge cellophane ribbons	Sample-Durick Co., Inc., Indian Orchard, Mass.
Detecto-Matic	Scales	Detecto Scales, Inc., Bklyn, N. Y.		Chenille and tinsel pointed gift wraps	Du-Tone Ribbon Corp., New York, N. Y.
Dewelco	Labeling adhesives	Dewey & Almy Chemical Co., Cambridge 8, Mass.	Dux Bak	Waxed kraft	Central Waxed Paper Co., Chicago, Ill.
Diacall	Filter	Karl Kiefer Machine Co., Cincinnati, O.	Dux-Pak	Carriers for cans and bottles	Brown & Bailey Co., Phila., Pa.
Dialane	Lacquered glassine	Riegel Paper Corp., New York, N. Y.	EZ	Hand operated air cleaner	U. S. Bottlers Machinery Co., Chicago, Ill.
Diagonals	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.	E-Z-Pac	Cellulose bags	U. S. Envelope Co., Springfield, Mass.
Diastretch	Fluted paper used in waterproof, paper-lined fabrics	Fulton Bag & Cotton Mills, Atlanta, Ga.	E-Z Sealer	Jaw type bag krimper	Pack-Rite Machine Corp., Milwaukee, Wis.
Dignity Cheviot	Paper for box coverings	Pejepscot Paper Co., New York, N. Y.	E. Z. Tearstrip	Paraffined containers	MonoServiceCo., Newark, N. J.
Disco	Imitation fabrics and wood grains	District of Columbia Paper Mills, Inc., Washington, D.C.	Eagloss	Gloss printing inks	Eagle Printing Ink Co., Div. General Printing Ink Co., New York, N. Y.
Diskup	Hot drink cup	Sealright Co., Inc., Fulton, N. Y.	Early American	Fancy printed Christmas papers	Louis Dejonge & Co., New York, N. Y.
Dispersite	Artificial dispersion of crude, reclaimed and synthetic rubbers	Dispersions Process, Inc., New York, N. Y.	Eastertone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Display-O	Window bags	Thomas M. Royal & Co., Phila., Pa.	Easy Lift	Combination paper bag closure and handle	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Displayologist	Designers	Everett F. Young Co., Providence, R. I.	Econo-Cards	Display cards	Waldorf Paper Products Co., St. Paul, Minn.
Dixie	Carton blanking machine	E. G. Stuede Mfg. Co., St. Paul, Minn.	Economy	Mailing bags	Bemis Bro. Bag Co., St. Louis, Mo.
Dixie Cups	Paper drinking cups and containers	Dixie-Vortex Co., Easton, Pa.	Economy	Fibre drums	Carpenter Container Co., Inc., Bklyn, N. Y.
Dallis	Cartons and boxes	The Dobeckmun Co., Cleveland, O.	Economy Mailer	Mailing box	The Mason Box Co., Attleboro Falls, Mass.
Domino Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.	Economy Packager	Carton sealer and weigher	Triangle Package Machinery Co., Chicago, Ill.
Demois	Automatic processing machines	Wood, Nathan & Virkus Co., Inc., Racine, Wis.	Economy Sprayko	Liquid spray to prevent ink drying on press	Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Doplex	Cellulose acetate laminated to plain or printed paper	The Dobeckmun Co., Cleveland, O.			
Doplex Brilliant	Laminated cartons	The Dobeckmun Co., Cleveland, O.			
Dotted Swiss	Waterproof paper	The Dobeckmun Co., Cleveland, O.			
Doubledge	Box papers	Hazen Paper Co., Holyoke, Mass.			
	Cellophane wrapper with double thick ends	The Dobeckmun Co., Cleveland, O.			

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Econopac	Specialty wraps	Milprint, Inc., Milwaukee, Wis.
Edtbauer-Duplex	Automatic net weigher machines	B. F. Gump Co., Chicago, Ill.
Egyptian	Paper lacquers	The Egyptian Lacquer Mfg. Co., New York, N. Y.
Elasti-Cal	Decalcomania for the rubber industry	The Meyercoed Co., Chicago, Ill.
Electrifugal	Liquid pumps	Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Elec-Tri-Pak	Electric vibratory feed weighers	Triangle Package Machinery Co., Chicago, Ill.
Electro Tempered	Bottles	Owens-Illinois Glass Co., Toledo, O.
Ellisco	Cans and metal containers	George D. Ellis & Sons, Inc., Phila., Pa.
Elmendorf	Tearing tester	Thwing-Albert Instrument Co., Phila., Pa.
Embite	Embossed mat papers	The Marvellum Co., Holyoke, Mass.
Empeco	Housefurnishing ware	National Can Corp., New York, N. Y.
Enameltette	Pyroxylin papers	C. R. Whiting Co., Inc., Hackensack, N. J.
Endweld	Tube filling and sealing machines	Karl Kiefer Machine Co., Cincinnati, O.
Engineered Precision	All Gardner - Richardson products	Gardner-Richardson Co., Middletown, O.
Engradal	Transparent decalcomania label	Palm, Fechteler & Co., New York, N. Y.
Essyew	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Ethocel	Ethyl cellulose for lacquers and molding compounds	The Dow Chemical Co., Midland, Mich.
Ethocel Plastic Granules	Ethyl cellulose molding granules	The Dow Chemical Co., Midland, Mich.
Ethocel Sheeting	Transparent ethyl cellulose sheeting	The Dow Chemical Co., Midland, Mich.
Eureka	Rule press	J. F. Helms & Bro., Inc., Chicago, Ill.
Evans 1303	Bendall attachment	The Commercial Paste Co., Columbus, O.
Evantik	Case sealing glue	The Commercial Paste Co., Columbus, O.
Everyday	Tipping in paste	International Ptg. Ink Div. of Interchemical Corp., New York, N. Y.
Every Use	Packaged inks in cans	Chas. W. Williams & Co., Inc., New York, N. Y.
Exact Weight	Box covering paper	Exact Weight Scale Co., Columbus, O.
Excelite	Check-weighing scales	Designers for Industry, Inc., Cleveland, O.
Excell-O	Thermo-setting plastic materials	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Executive	Printed cellulose ribbon	District of Columbia Paper Mills Inc., Washington, D. C.
Executive Velour	Suede finish	District of Columbia Paper Mills, Inc., Washington, D. C.
Ex-L-ite	Tin plate	Republic Steel Corp., Cleveland, O.
Express	Package sealers, gummed tape	Better Packages, Inc., Shelton, Conn.
Eye-Petized	Illustrations of prepared food labels	The United States Printing & Lithograph Co., Cincinnati (Norwood), Ohio
FCC Cord	Cord cellulose	Fibre Cord Co., New York, N. Y.
FMC	Canning machinery	Food Machinery Corp., Sprague-Sells Div., Hooperston, Ill.
F. S. C. C.	Sealing glue	F. G. Findley Co., Milwaukee, Wis.
Fabkote	Pyroxylin coated latex impregnated fibre	E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.
Fabrikoid	Pyroxylin coated and impregnated fabric	E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.
Fairtite	Box paper	Kupfer Bros. Co., New York, N. Y.
Falco	Inks	Fuchs & Lang Mfg. Co., Div. General Printing Ink Corp., New York, N. Y.
Faltex	Inks	Fuchs & Lang Mfg. Co., Div. General Printing Ink Corp., New York, N. Y.
Fanfare	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Fast to Light	Flint glazed papers	Wyomissing Glazed Paper Co., Reading, Pa.
Femwood	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Fibercote	Leatherette and wood grain covering material	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Fiberpak Drum	Fibre drum	The Container Co., Van Wert, O.
Fibestos	Cellulose acetate molding compound	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Fibo-Bilt	Die-cut display material	Badger Merchandising Displays Inc., Milwaukee, Wis.
Fibo-Board	Special heavy mounting board	Badger Merchandising Displays, Inc., Milwaukee, Wis.
Fibre Lite	Card stock	Waldorf Paper Products Co., St. Paul, Minn.
Fiesta Flowers	Fancy printed papers	Louis Dejonge & Co., New York, N. Y.
Fill-Freeze	Cartons	Container Corp. of America, Chicago, Ill.
Films-Seal	Innerseal covering mouth of bottle	Ferdinand Gutmann & Co., Bklyn, N. Y.
Fine Linen	Fancy printed	Louis Dejonge & Co., New York, N. Y.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Fine-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Fitchco	Board lining and paper	Fitchburg Paper Co., Fitchburg, Mass.
Flashdri	Quick drying printing inks	Fred H. Levey Co., Inc., New York, N. Y.
Flash Folia	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Flat-Tin-Can	Foil lined envelope	Berkowitz Envelope Co., Kansas City, Mo.
Flat-Top	Conveyor chain	Link-Belt Co., Chicago, Ill.
Flav-O-Fresh	Coffee bags	Oneida Paper Products, Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Flav-O-Tainer	Pliofilm lined bags	Thomas M. Royal & Co., Phila., Pa.
Fleetfold	Moistureproof - greaseproof box board	Sutherland Paper Co., Kalamazoo, Mich.
Fleurette	Box paper	Kupfer Bros. Co., New York, N. Y.
Flexi-Cap	Liquid and powder dispensing closures	Double Duty Products, Inc., Cleveland, O.
Flexi-Cartons	Paper bags	Bemis Bro. Bag Co., St. Louis, Mo.
Flexo-Flint	Laminating paper for folding	Matthias Paper Corp., Phila., Pa.
Flexotic	Folding box with 3 dimensional panels	National Folding Box Co., New Haven, Conn.
Flexpak	Flexible wrapping paper	Hinde & Dauch Paper Co., Sandusky, O.
Flintlok	Two-piece folding glued corner style	Hollywood Paper Box Div., The Flintkote Co., Hollywood, Calif.
Flipseal "H"	Metal snap-on type cap for non-vacuum glass containers	The Aridor Co., Chicago, Ill.
Flipseal	"V" Metal snap-on type cap for vacuum glass containers	The Aridor Co., Chicago, Ill.
Floradora	Lace box papers	Hazen Paper Co., Holyoke, Mass.
Flor-A-Fresh	Cellophane bags	Oneida Paper Products, Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Floralettes	Cellophane mats	Shellmar Products Co., Mt. Vernon, O.
Flossine	Padding paper-glassine backed	George H. Sweetnam, Inc., Cambridge, Mass.
Flowers and Frills	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Flowers and Ribbon	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Follette	Box paper	Kupfer Bros. Co., New York, N. Y.
Foil Sea Shell Swirl	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Folie Ting	Adhesives and acetate (special)	Mor-Gan Laminating & Foliating Co., New York, N. Y.
Folsman	Foil papers	C. R. Whiting Co., Inc., Hackensack, N. J.
Foldomatic	Folding and display cartons	The Interstate Folding Box Co., Middletown, O.
Fold-Pak	Shipping cartons	Container Corp. of America, Chicago, Ill.
Foldtitle	Mailing box	The C. J. Fox Co., Providence, R. I.
Food Pak	Plain cellophane bags	Food Packaging, Div. of Milprint, Inc., Milwaukee, Wis.
Food-Paks Force	Drinking containers	Dixie-Vortex Co., Easton, Pa.
Foxocals	Machine for numbering cases or cartons	Wm. A. Force & Co., Inc., Bklyn, N. Y.
Foxon	Decalcomania transfers	The Foxon Co., Providence, R. I.
Foxon	Labels, tags, seals	The Foxon Co., Providence, R. I.
Frame-Vue	Paper cartons, double end and side walls	The C. W. Zumbiel Co., Cincinnati (Norwood), O.
Fre-Pac	Ice cream package	Bloomer Bros. Co., Newark, Wayne Co., New York State
Freshen	Waxed bags	Dixie Wax Paper Co., Inc., Dallas, Texas
Frigid Board	Cold storage stock	Waldorf Paper Products Co., St. Paul, Minn.
Frostel	Pyroxylin metallic papers for labels, box coverings, covers, etc.	Plastic Coating Corp., Holyoke, Mass.
Frostex	Special papers and bags for frozen foods	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Front-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Full-Flow	Metal liquid shipping container	Wheeling Corrugating Co., Wheeling, W. Va.
Full Measure	Stock printed cellophane bags	The Dobeckum Co., Cleveland, O.
Full-View	Box window top	W. H. Deisroth Co., Inc., Phila., Pa.
Ful-Lok	Cellophane bags	Oneida Paper Products, Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Fusedge	Ribbon made of cut sealed acetate fabric	Freydberg Bros.-Strauss, Inc., New York, N. Y.
GB 2 Press	Stamping machine	Griffin, Campbell, Hayes, Walsh, Inc., New York, N. Y.
Gala	Casein	George Morrell Corp., Muskegon Heights, Mich.
Galom	Casein plastic	George Morrell Corp., Muskegon Heights, Mich.
Gator Hide	Kraft paper	George & Sherrard Paper Co., New York, N. Y.
Gaylord	Fibre boxes and folding cartons	Gaylord Container Corp., St. Louis, Mo.

Complete addresses of companies listed appear on pages 622-630

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Gem-Cote	Plastic laminations and coatings for paper and cardboard	Gemloid Corp., Elmhurst, L. I., N. Y.
Gemglo	Plastic flashlight with neon-glow effect	Gemloid Corp., Elmhurst, L. I., N. Y.
Gemlike	Plastic material with scintillating effect	Gemloid Corp., Elmhurst, L. I., N. Y.
Gemlite	Plastic molded containers with cloisonné engraving	Gemloid Corp., Elmhurst, L. I., N. Y.
Gemloid and Enameloid Cloisonné General	Plastic sheets with cloisonné designs	Gemloid Corp., Elmhurst, L. I., N. Y.
Georgian Silver	Box gluing machine	E. G. Staudt Mfg. Co., St. Paul, Minn.
Giant-Curve	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Gift Shop	Corrugated display material	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Glazed Chints	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Globular	Printed flint paper	Hampden Glazed Paper and Card Co., Holyoke, Mass.
Globular	Embossed parchment	George H. Sweetnam, Inc., Cambridge, Mass.
Glo-Ray	Gloss inks	International Ptg. Ink Div. of Interchemical Corp., New York, N. Y.
Glorette	Base paper for lacquer	Kupfer Bros. Co., New York, N. Y.
Gloss Colorcote	Composite paper and shipping cartons	Brooks Bank Note Co., Springfield, Mass.
Glosscote	One-piece box	Brooks Bank Note Co., Springfield, Mass.
Glossiroll	Special automatic quick set folding boxes	Excelsior Paper Specialties Co., New York, N. Y.
Glostone	Cartons for sheets, pillow cases, etc.	Paper City Mfg. Co., Inc., Holyoke, Mass.
Glorwite	Cellophane bags for bulk groceries	Brooks Bank Note Co., Springfield, Mass.
Glow-Cote	Automatic scales	Cambridge Paper Box Co., Cambridge, Mass.
Glu-Pa-Co	Letterpress inks	The F. G. Findley Co., Milwaukee, Wis.
Glu-X-Tender	Fancy paper	The F. G. Findley Co., Milwaukee, Wis.
Goldentone	Blender for animal and flexible glues	Chas. W. Williams & Co., Inc., New York, N. Y.
Gold-Medal	Box covering paper	Gaylord Container Corp., St. Louis, Mo.
Gold Seal	Solid fibre beer carriers	Dewey & Almy Chemical Co., Cambridge 8, Mass.
Gold Seal	Cap compound, tin paste cover compound, drum compound	Gummed Tape & Devices Co., Bklyn, N. Y.
Goldseal	Colored specialty tapes	Aluminum Seal Co., New Kensington, Pa.
Goldy	Bottle closure	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Golvaneer	Printing inks	Everett F. Young Co., Providence, R. I.
Go Safe Mailers	Mailing boxes	Standard Conveyor Co., N. St. Paul, Minn.
Gravity	Roller conveyors and spiral chutes	The Gray Wire Specialty Co., Cleveland, O.
Graywire	Display racks	Gardner-Richardson Co., Middletown, O.
Greasene	Grease resistant boxboard	Waldorf Paper Products Co., St. Paul, Minn.
Greasilite	Bakery package board	Mid-States Gummed Paper Co., Chicago, Ill.
Green Core	Gummed cloth tapes	American Paper Goods Co., Kensington, Conn.
Graystone	Clasp envelopes	Paisley Products, Inc., Chicago, Ill. & New York, N. Y.
Grip-Tight	Label paste for tin, metals	Chicago Gum Tape Co., Chicago, Ill.
Grip-Tite	Tape, gummed	Angier Corp., Framingham, Mass.
Grizzlybear	Waterproof stretchable wrapping paper	Guardian Safety Seal Co., Chicago, Ill.
Guardian	Temper proof aluminum bottle closures	United Mfg. Co., Springfield, Mass.
Guardman	Cover paper	Gummed Tape & Devices Co., Bklyn, N. Y.
Gumcraft	Gummed paper and tape	Gummed Tape & Devices Co., Bklyn, N. Y.
Gumcraft Liflat	Glassine	
	Flat label paper	
H & D	Corrugated shipping boxes	The Hinde & Dauch Paper Co., Sandusky, O.
Haller	Filling machines	Horix Mfg. Co., Pittsburgh, (4), Pa.
Halyard	Fruit and berry washers	Anchor Hocking Glass Corp., Lancaster, O.
Hammerclear	Wire opener cap	Anchor Hocking Glass Corp., Lancaster, O.
Hammerclear	Carton sealing paper	Anchor Hocking Glass Corp., Lancaster, O.
Hammerglass	Glassine paper	Anchor Hocking Glass Corp., Lancaster, O.
Hammerglint	Tarnish resistant paper	Anchor Hocking Glass Corp., Lancaster, O.
Hammer-Parchment	Greaseproof paper	Anchor Hocking Glass Corp., Lancaster, O.
Hampak	Printed transparent wraps	Daniels Mfg. Co., Rhineland, Wis.
Handelink	Carry bag	Wolf Bros., Phila., Pa.
Handilink	Tiering machine	Standard Conveyor Co., St. Paul, Minn.
Handirol	Mending and binding tape	Gummed Tape & Devices Co., Bklyn, N. Y.
Handy Service	Package of sterilized glass bottles	Owens-Illinois Glass Co., Toledo, O.
Hang-Rite	Garment holders	Waldorf Paper Products Co., St. Paul, Minn.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Hardshell	Non-rubbing inks	Eagle Printing Ink Co., Div. General Printing Ink Corp., New York, N. Y.
Hard-Tex	Inks	Fuchs & Lang Mfg. Co., Div. General Printing Ink Corp., New York, N. Y.
Harris	Lithographing and gravure presses	Harris-Seybold-Potter Co., Dayton, O.
Hartglass	Embossed sulphite	Hartford City Paper Co., Hartford City, Ind.
Helmo	Displays	Helmo, Inc., Chicago, Ill.
Helmo	Rules, cutters, notchers, joint brazers	J. F. Helmo & Bro., Inc., Chicago, Ill.
Hercules	Rule cutter	J. F. Helmo & Bro., Inc., Chicago, Ill.
Heresite	Phenol-formaldehyde molding compound	Heresite & Chemical Co., Manitowoc, Wis.
Hestico	Plastic tube clips	Heat Seal-It Co., Phila., Pa.
Hiawatha	Out-folding carton gluer	E. G. Staudt Mfg. Co., St. Paul, Minn.
Hi-Gear	Fibreboard products, Inc., San Francisco, Cal.	
Higlo	Automatic cartons	J. M. Huber, Inc., New York, N. Y.
Hi-Gloss	Gloss printing inks	Pope & Gray, Inc., New York, N. Y.
Hi-Gloss	Varnishes and inks	S. D. Warren Co., Boston, Mass.
Hi-Low	Base paper for lacquer	Container Corp. of America, Chicago, Ill.
Himes	Composite paper and shipping cartons	American Box Board Co., Grand Rapids, Mich.
Himes	One-piece box	Pollock Paper & Box Co., Dallas, Texas
Hi-Paco	Special automatic quick set folding boxes	High Point Paper Box Co., Inc., High Point, N. C.
Hi-Pak	Cartons for sheets, pillow cases, etc.	Thomas M. Royal & Co., Phila., Pa.
Hoepner	Cellophane bags for bulk groceries	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Holdfast	Automatic scales	International Ptg. Ink Div. of Interchemical Corp., New York, N. Y.
Holly Scroll	Letterpress inks	Louis Dejonge & Co., New York, N. Y.
Hollykote	Fancy paper	Hollywood Paper Box Div., The Flintkote Co., Hollywood, Cal.
Holm Scale	Special moisture and grease-proof treatment on paper board	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Hooper	Filling machine	F. X. Hooper Co., Inc., Glenview, Ill.
Horix	Corrugating, printing and container making machinery	Horix Mfg. Co., Pittsburgh, Pa.
Hi-Scale	Filling machine	Celanese - Celluloid Corp., New York, N. Y.
Huebriks	Synthetic Pearl Essence	Hazen Paper Co., Holyoke, Mass.
Humi-Jar	Box papers	Owens-Illinois Glass Co., Toledo, O.
Humitube	Jar	Humitube Mfg. Co., Peoria, Ill.
Hyalac	Bags, pouches, tubes and envelopes of cellophane	The Meyercord Co., Chicago, Ill.
Hyalcol	Window signs and decorations	Celluplastic Corp., Newark, N. J.
Hydro-Tite	Cellulose nitrate tubes and vials	Gardner-Richardson Co., Middletown, O.
Hydry	Asphalt center boxboard	E. J. Kelly Co., Kalamazoo, Mich.
Hy-Glos	Moisture set inks	Tompkins' Label Service, Phila., Pa.
Hy-Lustr	Gummed and ungummed labels	Robinson Tag & Label Co., New York, N. Y.
Hyroto	High gloss inks	Rotogravure Engineering Co., East Boston, Mass.
Hy-Speed	Rotogravure printing machine	Alsop Engineering Corp., New York, N. Y.
IPI	Bottling machinery	
IPI	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Ideal	Elevators, bucket type	B. F. Gump Co., Chicago, Ill.
Ideal	Wire stitching machine	Ideal Stitcher & Mfg. Co., Racine, Wis.
Illustra-Color	Reproduction method for displays	The U. S. Printing & Lithograph Co., Cincinnati, O.
Imperial Plastic	Handles, knobs, pulls, etc.	Imperial Molded Products Corp., Chicago, Ill.
Impervo	Cardboard outdoor display	Arvey Corp., Chicago, Ill.
Impression	Ink embossed box cover paper	The Marvellum Co., Holyoke, Mass.
Incaloid	Transparent sheeting, adhesives and coatings	American Products Mfg. Co., New Orleans, La.
Inco-Peds	Corrugated colored display material	Inland Container Corp., Indianapolis, Ind.
Inco-Rolls	Single face corrugated colored display	Inland Container Corp., Indianapolis, Ind.
Inco-Steps	Corrugated colored display material	Inland Container Corp., Indianapolis, Ind.
Indetia	Box paper	Kupfer Bros. Co., New York, N. Y.
Indur	Phenolic molding compounds, resins and varnishes	Reilly Tar & Chemical Corp., Indianapolis, Ind.
Innercoat	Plain waterproof wrapping paper	Angier Corp., Framingham, Mass.
Inner Lined	Combination carton, heat sealed bag enclosed	The Interstate Folding Box Co., Middletown, O.
Innerstrung	Reinforced waterproof wrapping paper	Angier Corp., Framingham, Mass.
"Insite" Signs	Decalcomania transfers	Milprint, Inc., Milwaukee, Wis.
Insulux	Glass block	Owens-Illinois Glass Co., Toledo, O.
Insurok	Custom laminated and molded plastic	The Richardson Co., Melrose Park (Chicago), Ill.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
In-Tag	Gravure inks	In-Tag Div. Interchemical Corp., New York, N. Y.
International	Automatic box making machinery	International Paper Box Machine Co., Nashua, N. H.
Ismacol	Stapling equipment	International Staple & Machine Co., Clifton Heights, Pa.
Isyngloss	Transparent waxed paper (self sealing)	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Italix	Tape, gummed	Nashua Package Sealing Co., Inc., Nashua, N. H.
Ivanhoe	Paper containers	Cambridge Paper Box Co., Cambridge, Mass.
Ivorytone	Opaque protective wrappers	Newark Paraffine & Parchment Paper Co., Newark, N. J.
JW	Air cleaners	U. S. Bottlers Machinery Co., Chicago, Ill.
JWD	Washers	U. S. Bottlers Machinery Co., Chicago, Ill.
Jacquard	Embossed and tipped papers	The Marvellum Co., Holyoke, Mass.
Jalcold	Tin plate	Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Jaypaco	Laminated board	Jaypaco Co., New York, N. Y.
Jaypaco	Laminated board	Joe Salwen Paper Co., New York, N. Y.
Judy	Rayon acetate fusedge ribbon	Freydberg Bros.-Strauss, Inc., New York, N. Y.
KVP	Waxed papers, plain and printed	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
K-600	Leatherette	Naragansett Coated Paper Corp., Pawtucket, R. I.
Keke Hot	Pick up cement	The F. G. Findley Co., Milwaukee, Wis.
Kakimaco	Filter	Karl Kiefer Machine Co., Cincinnati, O.
Kela Cork	Cork paper	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Kalafilm	Wrapping paper	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Kan-D-Pak	Printed transparent wraps	Daniels Mfg. Co., Rhinelander, Wis.
Kay-Dee-Pac	Paper pails	Container Corp. of America, Chicago, Ill.
Keglined	Beer and ale cans	American Can Co., New York, N. Y.
Kemgo	Printing compound	Markem Machine Co., Keene, N. H.
Kennecot	Pyroxylin coated papers	C. R. Whiting Co., Inc., Hackensack, N. J.
Kensington	Clasp envelopes	American Paper Goods Co., Kensington, Conn.
Keratol	Imitation leather	Atlas Powder Co., Zapon-Keratol Div., Stamford, Conn.
Keystone Stay	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Kidette	Box paper	Kupfer Bros. Co., New York, N. Y.
Kidskin	Pyroxylin box papers	Hazen Paper Co., Holyoke, Mass.
Kittie Plaids	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Kimpak	Creped wadding	Kimberly-Clark Corp., Neenah, Wis.
King Markwell	Marking and printing inks	Markem Machine Co., Keene, N. H.
Kivar	Artificial leather	The Plastic Coating Corp., Holyoke, Mass.
Klean	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Kleenway	Garbage and general utility bags	Oneida Paper Prods., Inc., New York, N. Y.; also Continental Bag Specialties Corp., New York, N. Y.
Kleer Glaze	Transparent waxed paper	Central Waxed Paper Co., Chicago, Ill.
Kleerview	Glassine	Rhineland Paper Co., Rhinelander, Wis.
Kleer View	Waxed glassine	Central Waxed Paper Co., Chicago, Ill.
Kleerwrap	Glassine	Rhineland Paper Co., Rhinelander, Wis.
Klondike	Gold and silver casein papers	C. R. Whiting Co., Inc., Hackensack, N. J.
Klothwhite	Retail store wrapping paper	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Knife-O	Closure	Owens-Illinois Glass Co., Toledo, O.
Kodaloid	Cellulose nitrate sheeting	Eastman Kodak Co., Rochester, N. Y.
Kodapak	Cellulose acetate sheeting	Eastman Kodak Co., Rochester, N. Y.
Kodalape	Gummed cloth tape	Eastman Kodak Co., Rochester, N. Y.
Koloprint	Automatic direct printing labeling machine (cans, bottles, etc.)	Designers for Industry, Inc., Cleveland, O.
Kork-N-Seal	Initial and re-sealing cap with lever	Continental Can Co., New York, N. Y.
Korogel	Soft form of Koroseal	The Crown Cork & Seal Co., Baltimore, Md.
Korolac	Solution of Koroseal	Williams Sealing Corp., Decatur, Ill.
Koroseal	Plasticized polyvinyl chloride	B. F. Goodrich Co., Akron, O.
Kraflex	Gummed kraft paper sealing tape	B. F. Goodrich Co., Akron, O.
Krimpac	Specialty wraps	Central Paper Co., Menasha, Wis.
		Milprint, Inc., Milwaukee, Wis.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Kromekote	High finish box paper	The Champion Paper & Fibre Co., Hamilton, Ohio
KwickKlasp	Genuine vegetable parchment	W. H. Deasroth Co., Inc., Philadelphia, Pa.
Kwik-Kleen	Mailing boxes	The Liquid Carbonic Corp., Chicago, Ill.
Kwikset	Filters (water)	Container Corp. of America, Chicago, Ill.
Kwik-Way	Paper cartons	Meyercord Co., Chicago, Ill.
L N F Bond	Nameplates	
L N F Bond	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Labco Fibre	Kraft board	The LaBoiteaux Co., Inc., Cincinnati, O.
Labelid	Ointment boxes	Columbia Specialty Co., Inc., Baltimore, Md.
Labelite	Fully automatic labelers	New Jersey Machine Corp., Hoboken, N. J.
Labelistik	Metal boxes	George D. Ellis & Sons, Inc., Myers Mfg. Div., Philadelphia, Pa.
Lace and Flowers	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Lace Frills	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Lacquelather	Waterproof leather papers	C. R. Whiting Co., Inc., Hackensack, N. J.
Lac-R-Print	Lacquered bags	Thomas M. Royal & Co., Philadelphia, Pa.
Lafayette	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Lamcote	Cellulose acetate lamination process	Arvey Corp., Chicago, Ill.
Lamcote Cover	Cover stock	Arvey Corp., Chicago, Ill.
Lamcote Fabrics	Cellulose laminated fabrics	Arvey Corp., Chicago, Ill.
Laminam	Laminated paper, cloth, foil	General Laminating Co., New York, N. Y.
Laminizing	Combination of cellulose acetate sheets to paper	U. S. Finishing & Mfg. Co., Chicago, Ill.
Laminoid	Combining of cellulose acetate to paper and textiles	Laminoid, Inc., N. Bergen, N. J.
Lamiphane	High-finished surface, polished from liquid application	Stecher-Traung Litho. Corp., Rochester, N. Y.
Lam-Lac	High-gloss lacquer finish for boxes, cartons and wraps	F. N. Burt Co., Inc., Buffalo, N. Y.
Lamofilm	Simplex moistureproof bags or moistureproof liners	Benj. C. Betner Co., Devon, Pa.
Lard Pak	Printed transparent wraps	Daniels Mfg. Co., Rhinelander, Wis.
Latham	Wire stitchers	Dexter Folder Co., New York, N. Y.
Lattisette	Box paper	Kupfer Bros. Co., New York, N. Y.
Lavette	Box paper	Kupfer Bros. Co., New York, N. Y.
Leafage	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Leatherette	Box paper	Kupfer Bros. Co., New York, N. Y.
Leatherette	Water proof leather finished papers	The Marvellum Co., Holyoke, Mass.
Leather Foil	Roll leaf for leather	Peerless Roll Leaf Co., Inc., Union City, N. J.
Lenonet	Open-mesh bags	Bemis Bro. Bag Co., St. Louis, Mo.
Lenox Gold	Gold and platinum box coverings	McLaurin-Jones Co., Brookfield, Mass.
Lepaco	Moisture and greaseproof board	Lebanon Paper Box Co., Lebanon, Pa.
Lev-A-Lift	Device for friction plug cans	The Lev-A-Lift Co., New York, N. Y.
Levelbest	Containers, shipping	Fibreboard Prods., Inc., San Francisco, Calif.
Leverpak Drum	Fibre drum	The Container Co., Van Wert, O.
Liftab	Milk bottle caps	Sealright Co., Inc., Fulton, N. Y.
Liftright	Milk bottle caps	Sealright Co., Inc., Fulton, N. Y.
Lightning	Coated box coverings	McLaurin-Jones Co., Brookfield, Mass.
Lightning Seal	Bread wrappers	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Likwid Proof Black	Ink	Chemical Color & Supply Co., Div. General Printing Ink Corp., Chicago, Ill.
Lily White	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Linco	Belt conveyor	Karl Kiefer Machine Co., Cincinnati, O.
Link-Belt	Elevating, conveying and power transmission equipment	Link-Belt Co., Chicago, Ill.
Lion Brand	Adhesives	Manhattan Paste & Glue Co., Inc., Bklyn., N. Y.
Liquid	Labeling machines and accessories	The Liquid Carbonic Corp., Chicago, Ill.
Liquid Plate	The Lamination (Custom) substitute	Mur-Gan Laminating & Foliating, New York, N. Y.
Liquid Single	Labeling machines	The Liquid Carbonic Corp., Chicago, Ill.
Liquipak Drum	Fibre drum	The Container Co., Van Wert, Ohio
Lizette	Box paper	Kupfer Bros. Co., New York, N. Y.
Lithocrome	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Lithopaque	Printing process	The Dobeckman Co., Cleveland, O.

Complete addresses of companies listed appear on pages 622-630

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TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Lithox	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Lithwite	White uncoated boxboard	The Gardner-Richardson Co., Middletown, O.
Loabond	Styrene laminating	Catalin Corp., New York, N. Y.
Loalin	Styrene molding powders	Catalin Corp., New York, N. Y.
Loavar	Styrene surface coating	Catalin Corp., New York, N. Y.
Lock-Tite	Dress box	American Box Board Co., Grand Rapids, Mich.
Lock Top	Screw top can with locking lugs	Continental Can Co., New York, N. Y.
Locktop	Paper ice cream can	National Folding Box Co., New Haven, Conn.
Locktop	Paper cans	Morris Paper Mills, Chicago, Ill.
Loc-Rim	Fibre shipping drums	Carpenter Container Corp., Bklyn, N. Y.
Loftee	Jewelry boxes and display	Union Wadding Co., Pawtucket, R. I.
Loksure	Waxed paper	Specialty Paper Co., Dayton, O.
Lo-Maintenance	Electric motors (3-phase and d-c)	Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Lookit	Set-up and acetate boxes	Flower City Specialty Co., Rochester, N. Y.
Loomlite	Textile box papers	Hazen Paper Co., Holyoke, Mass.
Lotol	Processed and/or compounded latex	Naugatuck Chemical Div., U. S. Rubber Co., New York, N. Y.
Low Pressure	Bottle fillers	The Liquid Carbonic Corp., Chicago, Ill.
Loxlite	Partition for packaging candy, cookies, beverages, eggs, fragile commodities, etc.	Traver Corp., Chicago, Ill.
Lucite	Methyl methacrylate resin	E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.
Lumarith	Cellulose acetate molding & packaging material	Celanese Celluloid Corp., New York, N. Y.
Lusteseal	Cellulose acetate sheets, rods, tubes and rolls	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Lusteroid	Sulphite wrappers and liners	Lusteroid Container Co., Inc., South Orange, N. J.
Lust-Cote	Transparent and colored vials and tubes	Eagle Printing Ink Co., Div. General Printing Ink Co., New York, N. Y.
Lustette	Gloss printing inks	Kupfer Bros. Co., New York, N. Y.
Lustre-Print	Box paper	Dennison Mfg. Co., Framingham, Mass.
Lustro	High gloss printed labels and seals	Milprint, Inc., Milwaukee, Wis.
Lustro	Aniline printing process	Food Packaging, Inc., Milwaukee, Wis.
Lustro	Cellophane ribbon	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Lustron	Polystyrene molding compound	Hartford City Paper Co., Hartford City, Ind.
Lustron	Wrapping paper	Owens-Illinois Glass Co., Toledo, O.
Lustrual	Closure	Reynolds Metals Co., Richmond, Va.
Lux-Lite	Displays with flashers	McLaurin-Jones Co., Brookfield, Mass.
Luxor Gold	Gold box covering	Matthias Paper Corp., Phila., Pa.
Luxorline	Box cover paper	
M & S	Fillers	Food Machinery Corp., Sprague-Sells Div., Hooperston, Ill.
Mailmaster	Mailing box	The Mason Box Co., Attleboro Falls, Mass.
Mainstay	Bag closing twine	Bemis Bro. Bag Co., St. Louis, Mo.
Makalot	Phenol resin molding compound	Makalot Corp., Boston, Mass.
Mallefold	Malleable crease display material	Waldorf Paper Products Co., St. Paul, Minn.
Marelux	Bags for hygroscopic products	Menasha Products Co., Menasha, Wis.
Marble-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Marco	Leather grain paper	The Marvellum Co., Holyoke, Mass.
Markem	Printing machines	Markem Machine Co., Keene, N. H.
Market Paper	Meat wrapping paper	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Master	Infolding diagonal gluing machine	E. G. Staudt Mfg. Co., St. Paul, Minn.
Masterbuilt	Candy boxes	F. J. Schleicher Paper Box Co., St. Louis, Mo.
Mastercraft	All Ben Mont products	Ben Mont Papers, Inc., Bennington, Vt.
Mastercraft	Leatherette boxes and displays	Harlich Mfg. Co., Mastercraft Div., Chicago, Ill.
Master Prints	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Master Ray	Metal surfaced counter and window displays	Reynolds Metals Co., Richmond, Va.
Masterwrap	Interfolded waxed tissue	Rhineland Paper Co., Rhineland, Wis.
Matador	Paper bag machines	H. H. Heinrich, Inc., New York, N. Y.
Match-Box	Kit for matching colors	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Mayfair	Salt and pepper shakers	Owens-Illinois Glass Co., Toledo, O.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Mayflower	Paper drinking cups	American Paper Goods Co., Kensington, Conn.
Mazein	Soluble extract of the protein in corn	Corn Products Refining Co., New York, N. Y.
McLaurin	Gummed tape tester	Thwing-Albert Instrument Co., Phila., Pa.
Measure Scoop	Bag filling device	Food Packaging, Div. of Milprint, Inc., Milwaukee, Wis.
Melco	Decorated metal containers	Seymour Products Co., Seymour, Conn.
Melmac	Melamine - formaldehyde molding compound	American Cyanamid Co., Plastics Div., New York, N. Y.
Melody Print	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Menasha	Paraffined cartons and papers	The Menasha Products Co., Menasha, Wis.
Mercury	Closure	Owens-Illinois Glass Co., Toledo, O.
Mercury	Carton gluer	E. G. Staudt Mfg. Co., St. Paul, Minn.
Mercury Process	Vignette for labels	The U. S. Printing & Lithograph Co., Cincinnati, O.
Mishlex	Fluted paper cemented to cotton web, for wrapping and concrete curing mats	Fulton Bag & Cotton Mills, Atlanta, Ga.
Metacel	Metal adhesive tape	Reynolds Metals Co., Richmond, Va.
Metal-Art	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Metal Art Plaid	Box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Metal Edge	Reinforced paper boxes	National Metal Edge Box Co., Phila., Pa.
Metal Lec	Metal printed and embossed friction glazed papers and boards	Keller-Dorian Corp., New York, N. Y.
Metalglass	Metallic coated glassine	Hartford City Paper Co., Hartford City, Ind.
Metaline	Printed embossed paper	Hampton Glazed Paper & Card Co., Holyoke, Mass.
Metallic	Pyroxylin coated metallic papers	Hazen Paper Co., Holyoke, Mass.
Metaloid	Embossed signs and boxes and plaques	Chaspec Mfg. Co., Inc., New York, N. Y.
Metaloid	Pyroxylin coated paper	The Dorco Coating Corp., Holyoke, Mass.
Metalour	Gold and silver papers	The Marvellum Co., Holyoke, Mass.
Metal Seal	Metallic papers	Bradner Smith & Co., Chicago, Ill.
Metalite	Flat gummed paper	The Gummed Products Co., New York, N. Y.
Metalone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Metalustre	Metallic lacquer enamels	Mass & Waldstein Co., Newark, N. J.
Metex	Gold or silver cellulose acetate	E. L. Courmand, Inc., New York, N. Y.
Methocel	Dow methyl cellulose	The Dow Chemical Co., Midland, Mich.
Metalak	Silver and gold ink	Pope & Gray, Inc., New York, N. Y.
Metso	Cleansers (sodium metasilicate)	Philadelphia Quartz Co., Phila., Pa.
Mezzotint	Printed and embossed metallic coated papers and boards	Keller-Dorian Corp., New York, N. Y.
Mic	Plastics, molded	Molded Insulation Co., Phila., Pa.
Micacrystal	Crinkled cellophane	Alding Paper Co., New York, N. Y.
Micocote	Super white boxboard	Michigan Carton Co., Battle Creek, Mich.
Midget	Static eliminator	The Simco Co., Phila., Pa.
Midget	Wire staples	Acme Staple Co., Camden, N. J.
Midget	Labeling machines and accessories	The Liquid Carbonic Corp., Chicago, Ill.
Miliah	Glues and pastes, gums, lacquers	National Adhesives Div., National Starch Products, Inc., New York, N. Y.
Millbridge	General	Springfield Coated Paper Corp., Camden, N. J.
Miller	Package and bundle wrapping machines	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Milliplastic	Extruded saran	Elmer E. Mills Corp., Chicago, Ill.
Mil-O-Seal	Pliofilm encasing cooked meat loaves	Milprint, Inc., Milwaukee, Wis.
Milwaukee	Aniline printing press and bronzing machines	C. B. Henschel Mfg. Co., Milwaukee, Wis.
Mirette	Box paper	Kupfer Bros. Co., New York, N. Y.
Mirofoil	Imitation foil papers	Marvellum Co., Holyoke, Mass.
Mirofite	Transparent thermoplastic papers	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Minodescent	Box papers	Hazen Paper Co., Holyoke, Mass.
Mirror Flints	Glazed flint	Louis Dejonge & Co., New York, N. Y.
Modern Clipper	Automatic bag-making machine	Modern Containers, Inc., Los Angeles, Calif.
Modeme Dull	Clay coated paper	Bradner Smith & Co., Chicago, Ill.
Modern Union	Metal displays	Union Steel Products Co., Albion, Mich.
Moistite	Bakery package board	Waldorf Paper Products Co., St. Paul, Minn.
Moist Prof	Set up paper cigar boxes	Consolidated Box Co., Inc., Tampa, Fla.
Molloy-Made	Imitation leather containers	The S. K. Smith Co., Chicago, Ill.
Monarch	Fillers	The Liquid Carbonic Corp., Chicago, Ill.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Monarch	Right angle folding box gluer	E. G. Staude Mfg. Co., St. Paul, Minn.
Monocell	Filter	Karl Kiefer Machine Co., Cincinnati, O.
Mono Kleen Kups	Paraffined containers	Mono Service Co., Newark, N. J.
Mono-Pak	Collapsible tubes for single use	A. H. Wirz, Inc., Chester, Pa.
Mono-Piston	Filling machine for viscous materials	Karl Kiefer Machine Co., Cincinnati, O.
Monoscale	Can filling machine	Karl Kiefer Machine Co., Cincinnati, O.
Mono Spout	Spout fitting	Continental Can Co., New York, N. Y.
Monsanto C. N.	Cellulose nitrate (pyroxylin)	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Morr Glos	Gloss ink	Geo. H. Morrill Co., Div. General Printing Ink Corp., New York, N. Y.
Morris	Box closing lock	Robertson Paper Box Co., Inc., Montville, Conn.
Morrison	Wire stitchers	Harris - Seybold - Potter Co., Dayton, O.
Mosaic Parquetry	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Moto-Air	Pump for vacuum and pressure	New Jersey Machine Corp., Hoboken, N. J.
Multi	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Multitite	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Multitone	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Mural	Fancy waterproof box paper	The Marvellum Co., Holyoke, Mass.
Myers Labelstik	Seamless metal boxes	George D. Ellis & Sons, Inc., Myers Mfg. Div., Phila., Pa.
Myracol	Cartons	Container Corp. of America, Chicago, Ill.
NCCO	Tin cans	National Can Corp., New York, N. Y.
Nafomatic	Folding paper box	National Folding Box Co., New Haven, Conn.
Nanking	Chinese papers	The Stevens-Nelson Paper Corp., New York, N. Y.
Napcones	Displays	The National Process Co., New York, N. Y.
Napconstruction	Unmounted displays	The National Process Co., New York, N. Y.
Nap grille	Displays	The National Process Co., New York, N. Y.
National	Labeling machines and accessories	The Liquid Carbonic Corp., Chicago, Ill.
National	Tape moistening machine	Nashua Package Sealing Co., Inc., Nashua, N. H.
National	Food products metal bags	Reynolds Metals Co., Richmond, Va.
National	Packaging machinery	U. S. Automatic Box Machinery Co., Inc., Roslindale, Boston, Mass.
Needlecraft	Paper for box coverings	Peapack Paper Co., New York, N. Y.
Neillite	Phenol-formaldehyde molding material	Watertown Mfg. Co., Watertown, Conn.
Neocell	Cellulose vials, containers and specialties	Celluplastic Corp., Newark, N. J.
Neo-Classic	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Nestcup	Nesting container	Sutherland Paper Co., Kalamazoo, Mich.
Nestrite	Nested, waxed and unwaxed containers	Lily-Tulip Cup Corp., New York, N. Y.
Nestyle	Nested type container	Sealright Co., Inc., Fulton, N. Y.
Neutraglas	High resistant glass	Kimble Glass Co., Vineland, N. J.
Neverstop	Carton filling and sealing machine	Stokes & Smith Co., Phila., Pa.
Newman Seal	Circular compounded crimped closure	Continental Can Co., New York, N. Y.
New Perfection	Dropping outfits	Pennsylvania Glass Products Co., Pittsburgh, Pa.
Nitron	Sheets, cellulose nitrate; rods and tubes	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Nixonite	Cellulose acetate (sheets, rods and tubes)	Nixon Nitration Works, Nixon, N. J.
Nixonite M.P.	Cellulose acetate molding powder	Nixon Nitration Works, Nixon, N. J.
Nixonoid	Cellulose nitrate (pyroxylin)	Nixon Nitration Works, Nixon, N. J.
Nojax	"Skinless" frankfurters	The Visking Corp., Chicago, Ill.
No-Kap	Closures	No-Kap Closures (U.S.A.), Inc., Providence, R. I.
No-Kap	Collapsible tubes	National Collapsible Tube Co., Providence, R. I.
Nolox	Knock-down paper box	American Box Board Co., Grand Rapids, Mich.
Nolox	Garment boxes	Morris Paper Mills, Chicago, Ill.
Nolox	Special automatic quick set folding boxes	Pollock Paper & Box Co., Dallas, Texas.
No-Lox	Folding carton	Robert Galy Co., Inc., New York, N. Y.
Non-Scuff	Liner board on corrugated boxes	F. J. Kress Box Co., Pittsburgh, Pa.
Norbutus	Pyroxylin coated metallic papers in brilliant colors	Hazen Paper Co., Holyoke, Mass.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Norloc	Molded plastic packages	Norton Laboratories, Inc., Lockport, N. Y.
No Sol Vit	Alkali free serum containers	T. C. Wheaton Co., Millville, N. J.
Novar	Decalcomania label	Palm, Fechteler & Co., New York, N. Y.
Nub-Linen	Fancy printed	Louis Dejonge & Co., New York, N. Y.
Nu-Craft	Display, corrugated	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Nu-Curve	Display, corrugated	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Nugget	Cover paper	United Mfg. Co., Springfield, Mass.
Nu-Glas	Glass tumblers, jars and bottles	Anchor Hocking Glass Corp., Lancaster, O.
NuGlaze	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Nu-Hide	Box cover paper	Matthias Paper Corp., Phila., Pa.
NuMat	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Nu-Trim	Display, corrugated	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Nuvohack	Folding paper box	Everett F. Young Co., Providence, R. I.
Nuvopak	Merchandising containers	Cambridge Paper Box Co., Cambridge, Mass.
O. & J.	Labeling machines and accessories	Liquid Carbonic Corp., Chicago, Ill.
Obaco	Folding paper box	National Folding Box Co., New Haven, Conn.
Oldelace	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Old Tavern	Gold and platinum box coverings	McLaurin-Jones Co., Brookfield, Mass.
One-A-Time	Pill box	National Folding Box Co., New Haven, Conn.
Onized	Containers	Owens-Illinois Glass Co., Toledo, O.
Opallite	Cast phenolic semi-transparent	Catalin Corp., New York, N. Y.
Opalon	Cast phenolic resin and castings	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Orientone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Orpco	Corrugated boxes and displays	Ottawa River Paper Co., Toledo, O.
Outserts	Package adv. for the outside of containers	Outserts, Inc., New York, N. Y.
Overseal	Bottle closure	Aluminum Seal Co., New Kensington, Pa.
P.I.V. & V.R.D.	Variable speed transmission	Link-Belt Co., Chicago, Ill.
PMS Gel	Adhesives, starch derived	Stein, Hall Mfg. Co., Chicago, Ill.
P Type	Liquid bottling machine	Karl Kiefer Machine Co., Cincinnati, O.
Pace-Maker	Table gummer	New Jersey Machine Corp., Hoboken, N. J.
Packer	Case sealing machines, (gummed tape)	Better Packages, Inc., Shelton, Conn.
Packomatic	Packaging machinery	J. L. Ferguson Co., Joliet, Ill.
Packomatic Chief	6-in-line net wt. scale	J. L. Ferguson Co., Joliet, Ill.
Packomatic Commander	Container opener and positioner	J. L. Ferguson Co., Joliet, Ill.
Packrette	Box paper	Kupfer Bros. Co., New York, N. Y.
Pac-Kups	Paper containers	Die-Vortex Co., Easton, Pa.
Padinol	Flexible adhesive	The Fales Chemical Co., Inc., Cornwall Landing, N. Y.
Padocel	Wadding for packing	Geo. H. Sweetnam, Inc., Cambridge, Mass.
Padorel	Padded paper	Geo. H. Sweetnam, Inc., Cambridge, Mass.
Padox	Candy box tops	Union Wadding Co., Pawtucket, R. I.
Padsit	Padding paper—glassine backed	Geo. H. Sweetnam, Inc., Cambridge, Mass.
Pads-It	Cold process padding gum	The Commercial Paste Co., Columbus, O.
Paisflex	Flexible adhesives	Paisley Products, Inc., Chicago, Ill.; also New York, N. Y.
Paisley	General line	Paisley Products, Inc., Chicago, Ill.; also New York, N. Y.
Paislex	Latex base adhesives	Paisley Products, Inc., Chicago, Ill.; also New York, N. Y.
Paistick	Office, school, library paste	Paisley Products, Inc., Chicago, Ill.; also New York, N. Y.
Paker Bulkan	For bulk shipments, up to 30 lb.	Sealright Co., Inc., Fulton, N. Y.
Pak King	Automatic package filler	Weight Right Automatic Scale Co., Joliet, Ill.
Palmetto	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Pamilla	Silver polishing cloth	The Gorham Co., Providence, R. I.
Paperglos	Glassine paper	Westfield River Paper Co., Russell, Mass.
Papricloth	Treated parchment	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Parafane	Super-transparent, glassine, lacquered paper	Paramount Paper Products Co., Inc., Phila., Pa.
Paragon	Two-piece caps	Anchor Hocking Glass Corp., Lancaster, O.
Parakote	Moistureproof coated packaging papers	Menasha Products Co., Menasha, Wis.
Paramount	General	Paramount Paper Products Co., Inc., Phila., Pa.

Complete addresses of companies listed appear on pages 622-630

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Paraply	Moistureproof - greaseproof bakery packages	Menasha Products Co., Menasha, Wis.
Paraply	Moistureproof and greaseproof laminated cartons	The Menasha Products Co., Div. Marathon Paper Mills Co., Menasha, Wis.
Parawax	All coated moistureproof bags	Paramount Paper Products Co., Inc., Phila., Pa.
Parchkin	Vegetable parchment for art printing	Paterson Parchment Paper Co., Bristol, Pa.
Parchstone	Greaseproof innerwrap	Rhineland Paper Co., Rhineland, Wis.
Parkay	Woodgrain box papers	Hazen Paper Co., Holyoke, Mass.
Parkwood Textolite	Impregnated wood plastic material	Parkwood Corp., Wakefield, Mass.
Parquet	Wood grain (imitation) box covers	District of Columbia Paper Mills, Inc., Washington, D. C.
Parqueste	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Parry	Paper box machinery	Samuel R. Parry Mach. Co., Inc., Rochester, N. Y.
Pastel Creations	Paper for box coverings	Pejepscot Paper Co., New York, N. Y.
Patapake	A white paper for printing and packaging	Paterson Parchment Paper Co., Bristol, Pa.
Pataper	Grease-resisting and boil-proof vegetable parchment	Paterson Parchment Paper Co., Bristol, Pa.
Patawite	A 9-lb. manifold	Paterson Parchment Paper Co., Bristol, Pa.
Paterson	Genuine vegetable parchment	Paterson Parchment Paper Co., Bristol, Pa.
Paxwell	Padding	American Lace Paper Co., Milwaukee, Wis.
Pee Gee	Reducing and non-scratch ink compounds	Pope & Gray, Inc., New York, N. Y.
Peel-Pail	Ice cream pail	Bloomer Bros. Co., Newark, New York State
Peerless	Stamping presses	Peerless Roll Leaf Co., Inc., Union City, N. J.
Peerless	Roll leaf	E. G. Staudt Mfg. Co., St. Paul, Minn.
Peerless	Infolding gluing machine	U. S. Bottlers Machinery Co., Chicago, Ill.
Peerless	Label gummers	Kupfer Bros. Co., New York, N. Y.
Pellatie	Box paper	Kupfer Bros. Co., New York, N. Y.
Penargette	Box paper	Kupfer Bros. Co., New York, N. Y.
Penoscope	Penetration tester	Thwing-Albert Instrument Co., Phila., Pa.
Perfect Circle Plates	Engravings	Champlain Div., Interchemical Corp., New York, N. Y.
Perfection	Box covering papers	Royal Paper Corp., New York, N. Y.
Perfection	Medicinal glassware	Pennsylvania Glass Products Co., Pittsburgh, Pa.
Perfect-O-Cut	Labels and seals	The Tablet & Ticket Co., Chicago, Ill.
Perfecto Pac	Pie collar	Milprint, Inc., Milwaukee, Wis.
Petite Moire	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Phantom	Embossed box papers	Hazen Paper Co., Holyoke, Mass.
Phantom-Lite	Displays with flashers	Reynolds Metals Co., Richmond, Va.
Phenix	Glass bottles	Armstrong Cork Co., Lancaster, Pa.
Phoenix	Band cap	Phoenix Metal Cap Co., Chicago, Ill.
Photomailer	Cone top can	Hinde & Dauch Paper Co., Sandusky, O.
Pickets	Mailing envelopes	F. G. Findley Co., Milwaukee, Wis.
Pie-Pak	Uniform pellets of hot pick-up cement	Pie-Pak Co., Inc., Hoboken, N. J.
Pie-Proof	Container for pies	Aluminum Seal Co., New Kensington, Pa.
Pillar-Proof	Bottle closure	Chas. W. Williams & Co., Inc., New York, N. Y.
Pin Stripes	Box covering paper	The Marvellum Co., Holyoke, Mass.
Pinix	Printed box paper	Hazen Paper Co., Holyoke, Mass.
Pique	Embossed mica paper	Holyoke Card & Paper Co., Springfield, Mass.
Pique Embossed	Box covering paper	Hazen Paper Co., Holyoke, Mass.
Plaid Sheen	Embossed mica paper	Columbia Specialty Co., Inc., Baltimore, Md.
PlainLid	Ointment boxes	McLaurin-Jones Co., Brookfield, Mass.
Planet	Sealing tapes	Plaskon Co., Inc., Toledo, O.
Plaskon	Urea formaldehyde molding compound	E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.
Plastacel	Cellulose acetate sheeting and molding powder	Keller-Dorian Corp., New York, N. Y.
Plastek	Color printed and embossed friction glazed papers and boards	Louis Dejonge & Co., New York, N. Y.
Plastic Basket	Fancy paper	The Dobeckmun Co., Cleveland, O.
Plasticolor	Cellulose laminated cover paper	Foxon Co., Providence, R. I.
Plasticote	Plastic nameplates and signs	Peerless Roll Leaf Co., Union City, N. J.
Plastik Foil	Roll leaf for plastics	Deerfield Glassine Co., Monroe Bridge, Mass.
Platoglassine	Bleached glassine	Meas & Waldstein Co., Newark, N. J.
Platolustre	Transparent colored lacquers	Rohm & Haas Co., Phila., Pa.
Plasiglas	Methyl methacrylate molding compound	Rexford Paper Co., Milwaukee, Wis.
Plit-Fast	Sealing tapes	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Plio	Pliofilm ribbon	

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Pliofilm	Rubber-hydrochloride sheeting	The Goodyear Tire & Rubber Co., Akron, O.
Pliofilm	Transparent sheeting	The Goodyear Tire & Rubber Co., Akron, O.
Pliolite	Coating material	The Goodyear Tire & Rubber Co., Akron, O.
Pliolite	Moistureproof liquid casting	The Goodyear Tire & Rubber Co., Akron, O.
Plio-Ribbon	Printed pliofilm ribbon	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Pliosede	Velour pliofilm	Cellusuede Products, Inc., Rockford, Ill.
Plio-Tye	Plastic coated material made of Pliofilm	Freydberg Bros.-Strauss, Inc., New York, N. Y.
Plyglass	Multi-ply laminated glassine	Deerfield Glassine Co., Monroe Bridge, Mass.
Ply-Metal	Foil containers	Reynolds Metals Co., Richmond, Va.
Plymouth	Paper drinking cups	The American Paper Goods Co., Kensington, Conn.
Pneumatic	Packaging and bottling equipment	Pneumatic Scale Corp., Ltd., N. Quincy, Mass.
Pocomo	Box cover paper	Matthias Paper Corp., Phila., Pa.
Polymerin	Quick-bake enamel finish	Ault & Wiborg Corp., New York, N. Y.
Pony	Small table gluers	New Jersey Machine Corp., Hoboken, N. J.
Pony Gummer	Table gummer	New Jersey Machine Corp., Hoboken, N. J.
Pony Labelrite	Semi-automatic labelers	New Jersey Machine Corp., Hoboken, N. J.
Popular Priced	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Porcell	Containers, molded pulp	American Lace Paper Co., Milwaukee, Wis.
Porthos	Cover paper	United Mfg. Co., Springfield, Mass.
Port Low	Portable gravity sections	The Alvey-Ferguson Co., Cincinnati, O.
Postage-Meter	Postage metertape	Gummed Tape & Devices Co., Blynn, N. Y.
Postalitt	Pocket letter scales	The Esco Weight Scale Co., Columbus, O.
Pow-Aid	Liquor pourer	Lanfare Molded Products, Toledo, O.
Pow-N-Seal	Initial and re-sealing cap with lever and pouring spout	Continental Can Co., New York, N. Y.
Pouring-Pull	Milk bottle cap	The Crown Cork & Seal Co., Baltimore, Md.
Powrwall	Foot power bag crimper	Williams Sealing Corp., Decatur, Ill.
Pres-Decal	Truck signs and lettering	Sealright Co., Inc., Fulton, N. Y.
Precision	Medicinal droppers	Cleveland Crimping Press Co., Cleveland, O.
Pres-A-Ply	Pressure sensitive labels	The Meyerord Co., Chicago, Ill.
Presail	Liquid dispensers	Pennsylvania Glass Products Co., Pittsburgh, Pa.
Presto	Box and label printing machines	Dennison Mfg. Co., Framingham, Mass.
Price It	Stock design cellophane bags	The Food Dispenser Co., Hartford, Conn.
Print-Ad-String	Cotton tape and twine	Markem Machine Co., Keene, N. H.
Print-a-Wrap	Cellophane sheets and rolls	Food Packaging, Div. of Milprint, Inc., Milwaukee, Wis.
Printcolor	Process for dyeing of all form of Cellulose Acetate and Acetate Butyrate (Tenite II)	Chicago Printed String Co., Chicago, Ill.
Print-Cote	Protective overprint for coating printed sheets of cellulose acetate	Oneida Paper Prods., Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Printoid	Transparent containers	Printloid, Inc., New York, N. Y.
Print-O	Waxed wrapping paper	Printloid, Inc., New York, N. Y.
Printweigh	Electric weight-printer	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Pris-O-Matic	Easy loading "Cellophane" bags	Toledo Scale Co., Toledo, O.
Producer	Wrappers	The Dobeckmun Co., Cleveland, O.
Prosperity	Meat wrapping paper	Gelman Mfg. Co., Rock Island, Ill.
Protectall	Fibreboard and corrugated board boxes	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Protection-Plus	Special bags for food and chemicals	Container Corp. of America, Chicago, Ill.
Protectopac	Specialty wraps	Equitable Paper Bag Co., Inc., Long Island City, N. Y.
Protek-Sorb	Adsorption for elimination of moisture damage	Milprint, Inc., Milwaukee, Wis.
Protek-sorb	Moisture absorbent chemical	Davis Chemical Corp., Silica Gel Dept., Baltimore, Md.
Protekstar	Moth repellent paper	Davison Chemical Corp., Baltimore, Md.
Protekrol	Transparent, protective stripping lacquer	Central States Paper & Bag Co., St. Louis, Mo.
Protex	Padding	Ault & Wiborg Corp., New York, N. Y.
Protinol	Label adhesive	American Lace Paper Co., Milwaukee, Wis.
Prosmalts	Molten coatings (melts)	The Fales Chemical Co., Inc., Cornwall Landing, N. Y.
Proxmesh	Closed mesh fabrics	Pyroxilin Products Inc., Chicago, Ill.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Crystal	Clear cast phenolic plastic	Catalin Corp., New York, N. Y.
Pure-Cone	Paper bottle	Sutherland Paper Co., Kalamazoo, Mich.
Pure-Pail	Ice cream package	Bloomer Bros. Co., Newark, Wayne Co., New York State.
Pure-Pak	Milk containers	Fibreboard Prods., Inc., San Francisco, Calif.
Pure-Pak	Milk blanks	Gardner-Richardson Co., Middletown, O.
Pure-Pak	Paper milk containers	American Paper Bottle Co., Toledo, O.
Puritan	Paper drinking cups	The American Paper Goods Co., Kensington, Conn.
Puritan	Milk blanks	Gardner-Richardson Co., Middletown, O.
Pure Pak	Poultry box lining waxed paper	Central Waxed Paper Co., Chicago, Ill.
Purse Kit	Cosmetic kit	Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
Pyralin	Cellulose nitrate (pyroxilin)	E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.
Pyrelon	Box paper	The Marvellum Co., Holyoke, Mass.
Pyrette	Box paper	Kupfer Bros. Co., New York, N. Y.
Pyrex	Corning glass products	Corning Glass Works, Corning, N. Y.
Pyrodescent	Iridescent or pearl papers	Pyrotex Leather Co., Leominster, Mass.
Pyro-Seal	Pyroxilin metallic board stock	Bradner Smith & Co., Chicago, Ill.
Pyro Sheen	Pyroxilin coated papers	Pyrotex Leather Co., Leominster, Mass.
Pyroxote	Lacquers	Pyroxilin Products, Inc., Chicago, Ill.
Q. E. D.	Bottle label gum	F. G. Findley Co., Milwaukee, Wis.
Quadrimatec	Transparent bag of exceptional strength	The Dobeckmun Co., Cleveland, O.
Quick	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Quick Pac	Cracker caddy	Robert Gair Co., Inc., New York, N. Y.
Quick-Set Compound	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Quikseal	Closure	Owens-Illinois Glass Co., Toledo, O.
Quik-Set	Folding carton	Robert Gair Co., Inc., New York, N. Y.
R.C. Chip	Super finish chip board	The Butterfield-Barry Co., New York, N. Y.
RO	Closure	Aluminum Seal Co., New Kensington, Pa.
R-60 Single Edger	Machine, beading straight edge of plastic sheet	Taber Instrument Co., N. Tonawanda, N. Y.
R-70 Duplex Edger	Machine for beading two parallel edges of plastic strips	Taber Instrument Co., N. Tonawanda, N. Y.
R-70 Single Edger	Machine for beading straight edge of plastic sheet	Taber Instrument Co., N. Tonawanda, N. Y.
Radian	Embossed paper—not coated	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Rainbow	Paper for box coverings	Peapack Paper Co., New York, N. Y.
Rainbow	Flint paper	Bradner Smith & Co., Chicago, Ill.
Rainbow	Reinforced cellophane bags	The Munson Bag Co., Cleveland, O.
Rainbow	Box Covering Paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Rapid-Wheel	Portable conveyor	The Rapids-Standard Co., Inc., Grand Rapids, Mich.
Rarewood	Woodgrain box papers	Hazen Paper Co., Holyoke, Mass.
Rayette	Box paper	Kupfer Bros. Co., New York, N. Y.
Rayon	Mica coated and embossed papers	The Marvellum Co., Holyoke, Mass.
Rayon-Bow	Rayon ties	Fibre Cord Co., New York, N. Y.
Ray-Rib	Rayon ribbon	Fibre Cord Co., New York, N. Y.
Real	Greaseproof	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Really Flo	Gummed papers	Mid-States Gummed Paper Co., Chicago, Ill.
Red Core	Gummed sealing tape	Redford Paper Co., Milwaukee, Wis.
Red Diamond	Bottle washer and filler	The Liquid Carbonic Corp., Chicago, Ill.
Reddipap	Greaseproof wrap for liners, etc.	Riegel Paper Corp., New York, N. Y.
Redington	Packaging and cartoning machines	F. B. Redington Co., Chicago, Ill.
Red Strips	Extra heavy box cambric	Redford Paper Co., Milwaukee, Wis.
Reel-Hide	Box cover paper	Metthias Paper Corp., Phila., Pa.
Reel-Pak	Fibre film boxes	Gaylord Container Corp., St. Louis, Mo.
Reflectone	Flint glazed papers	Wyomissing Glazed Paper Co., Reading, Pa.
Reilly Indur	Molding powders & phenol-formaldehyde resins, varnishes, etc.	Reilly Tar & Chemical Corp., Indianapolis, Ind.
Reindeer	Fancy paper	Louis Dejonge & Co., New York, N. Y.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Renaissance	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Renicote	Metallic printing stock for box covering	Reynolds Metals Co., Richmond, Va.
Repaco	Wrappers—indented inner and outer wraps	The Republic Paperboard Co., Cincinnati, O.
Repeall	Protective paper	Hazen Paper Co., Holyoke, Mass.
Reptile	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Re-Seal-It	Re-sealing bottle caps	Reynolds Metals Co., Richmond, Va.
Resinox	Phenolic molding compound resins	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Revelation	Cellophane wrappers and bags	Milprint, Inc., Milwaukee, Wis.
Revolving Merchandiser	Electric turntables	Motion Displays, Inc., Bklyn, N. Y.
Rex	Chains and conveyors	Chain Belt Co., Milwaukee, Wis.
Reyco	Metal bottleneck wraps	Reynolds Metals Co., Richmond, Va.
Reyrcraft	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Reycurv	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Reydec	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Reyflute	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Reytone	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Reytrim	Corrugated decorative display papers and boards	The Reyburn Mfg. Co., Inc., Phila., Pa.
Rhomboid	Display carton	Robert Gair Co., Inc., New York, N. Y.
Ribbon and Pine	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Ribbonette	Fancy tying material	Chicago Printed String Co., Chicago, Ill.
Rib-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Richleaf Gold and Platinum Ridgelo	Casein metallic coated papers, brush finish, laminated box-boards	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Riegeline	Transparent glassine	Lowe Paper Co., Ridgefield, N. J.
Riegelite	Transparent waxed glassine	Riegel Paper Corp., New York, N. Y.
Rim Grip	Beaded tumbler caps	Riegel Paper Corp., New York, N. Y.
Rimseal "H"	Metal snap-on type cap for non-vacuum glass tumblers	Swan Metal Cap Co., Inc., Chicago, Ill.
Rimseal "V"	Metal snap-on type cap for vacuum glass tumblers	The Aridor Co., Chicago, Ill.
Ripco	Greaseproof paper	Rhineland Paper Co., Rhineland, Wis.
Ripco Auto-Pak	Greaseproof innerwrap	Rhineland Paper Co., Rhineland, Wis.
Rip-Cord	Device for closing cotton and burlap bags	Bemis Bro. Bag Co., St. Louis, Mo.
Riplette	Box paper	Kupfer Bros. Co., New York, N. Y.
Ripple	Box cover	District of Columbia Paper Mills, Inc., Washington, D. C.
Ripplekraft	Stretchable wrapping paper	Angier Corp., Framingham, Mass.
Rippletone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Rippl'Tie	Fancy tying material	Chicago Printed String Co., Chicago, Ill.
Rite-Price	Stock printed cellophane bags	The Dobeckmun Co., Cleveland, O.
Rite-Way	Bags and wrapping paper	Gaylord Container Corp., St. Louis, Mo.
Rockette	Box paper	Kupfer Bros. Co., New York, N. Y.
Roll-Rite	Rolling pin	Owens-Illinois Glass Co., Toledo, O.
Rose	Display box	Morris Paper Mills, Chicago, Ill.
Rotary "X"	Web rotary tape press	Package Sealing & Label Co., New York, N. Y.
Rotokits	Containers for spices, herbs and salts	Guttersen & Co., Inc., New York, N. Y.
Rotopaque	Printing process for transparent film	The Munson Bag Co., Cleveland, O.
Roto Prints	Metallic box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Rotoseal	Carton forming, lining, folding, closing, machine	Interstate Folding Box Co., Middletown, O.
Reveals—RO	Roll-on tamperproof over standard roll-on	Aluminum Seal Co., New Kensington, Pa.
Royal	Protective milk bottle hoods	Reynolds Metals Co., Richmond, Va.
Royal Satin	Super finish news board	The Butterfield-Barry Co., Inc., New York, N. Y.
Royal Satin	Quality newsboard for quality boxes	The Butterfield-Barry Co., Inc., New York, N. Y.
R.T.G.	Folding cartons and displays	The Richardson Taylor-Globe Corp., Cincinnati, O.
Rushtec	Imitation English grass paper	Paper Affiliates Co., Inc., New York, N. Y.
ST	Double shell caps	Phoenix Metal Cap Co., Chicago, Ill.
S & S	Filling, packaging, wrapping paper box machines	Stokes & Smith Co., Frankford, Phila., Pa.
S-Film	Transparent transfer film	Plastic Coating Corp., Holyoke, Mass.

Complete addresses of companies listed appear on pages 622-630

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Safedge	Tumblers	Owens-Illinois Glass Co., Toledo, O.
Saf-Eg	Cushion bottom egg carton	Sutherland Paper Co., Kalamazoo, Mich.
Safe Myx	Spray solution	Triangle Ink & Color Co., Inc., Bklyn, N. Y.
Safe Pack	Automatic egg carton	Grant Paper Box Co., Pittsburgh, Pa.
Safetex	Gummed kraft paper sealing tape	Central Paper Co., Menasha, Wis.
Safetex	Carton for textile products	Shuttleworth Carton Co., Inc., New York, N. Y.
Safe-T-Seal	Sealing tape	Rexford Paper Co., Milwaukee, Wis.
Safety-Seal	Mailing boxes	W. H. Deisroth Co., Inc., Phila., Pa.
Safeway	Counter rolls of cellophane and roll cutters	Safeway Products Corp., New York, N. Y.
Saflex	Safety glass plastic, vinyl acetate	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Saf-T-Loid	Cellulose acetate boxes	Parfalt Powder Puff Co., Chicago, Ill.
St. Albans	Colored design papers	Stevens-Nelson Paper Corp., New York, N. Y.
St. Valentine	Box paper	Kupfer Bros. Co., New York, N. Y.
Salens	Package inserts	Stecher - Traung Lithograph Corp., Rochester, N. Y.
Sales Appeal	All coated moistureproof bags	Paramount Paper Products Co., Inc., Phila., Pa.
Salespackage	Glass containers	Owens-Illinois Glass Co., Toledo, O.
Sandalwood	Imitation wood grain box covers	District of Columbia Paper Mills, Inc., Washington, D. C.
Sani-Glas	Processed sterilized prescription bottles	Brockway Glass Co., Inc., Brockway, Pa.
Sani-Seal	Metal milk or water caps	Ferdinand Gutmann & Co., Bklyn, N. Y.
Sani-Sherm	Fluted liners	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Sanitair	Double action air cleaner	U. S. Bottlers Machinery Co., Chicago, Ill.
Sanitape	Tablet packager	Ivers-Lee Co., Newark, N. J.
Sanitape-Sealtite	Heat sealed, unit packages of tablets, capsules, pills	Ivers-Lee Co., Newark, N. J.
Sani-Trete	Condiment dispensers	Imperial Molded Products Corp., Chicago, Ill.
Saran	Vinylidene chloride molding material	The Dow Chemical Co., Midland, Mich.
Saranac	Wire stitching machines	Saranac Machine Co. Benton Harbor, Mich.
Sateen	Mica embossed	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Satinettes	Box paper	Kupfer Bros. Co., New York, N. Y.
Satin-Glo	Display fabric	Columbus Coated Fabrics Corp., Columbus, O.
Satinleen	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Satinstone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Satinwood	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Seva-A-Seal	Closure	Owens-Illinois Glass Co., Toledo, O.
Scotch Cellulose	Cellophane tape	Minnesota Mining & Mfg. Co., St. Paul, Minn.
Scotch fabrics	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Scotch Plaids	Paper for box coverings	Pejepscot Paper Co., New York, N. Y.
Scotchweave	Box covers	District of Columbia Paper Mills, Inc., Washington, D. C.
Scott	Net weighing machines (dry products)	U. S. Automatic Box Machinery Co., Inc., Roslindale, Boston, Mass.
Scuff-Proofed	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Scal-Pruf	Box cover paper	Matthias Paper Corp., Phila., Pa.
Scutan	Waterproof paper	Union Bag & Paper Corp., Scutan Div., New York, N. Y.
Sealfoam	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Seal Brand	Adhesives (sodium silicate type)	Philadelphia Quartz Co., Phila., Pa.
Sealcone	Paper container	American Sealcone Corp., New York, N. Y.
Se-All	Jars and bottles	Owens-Illinois Glass Co., Toledo, O.
Sealon	Hooded milk bottle closure	Sealright Co., Inc., Fulton, N. Y.
Sealright	Protective paper containers	Sealright Co., Inc., Fulton, N. Y.
Seal-Spout	Aluminum pouring spout	American Aluminum Ware Co., Newark, N. J.
Sealtight	Sealing machines	Heat Seal-It Co., Phila., Pa.
Sealtight	Bag closing machine	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Sealtite	Paper bag sealers	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Sealtite-Uniwrap	Individual label attached package	Ivers-Lee Co., Newark, N. J.
Sealtonic	Wetting agent	Seal, Inc., Shelton, Conn.
Seal-Tye	Combination pasted and metal tie closure	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Seals	Thermoplastic rubber compounds	Dispersions Process, Inc., New York, N. Y.
Seabrol	Poster making process	The Forbes Lithograph Mfg. Co., Boston, Mass.
See-Thru	Rigid transparent container	Geo. V. Clark Co., Inc., Long Island City, N. Y.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Self-Locking	Egg carton	Self-Locking Carton Co., Chicago, Ill.
Self Seal	Open end envelopes	U. S. Envelope Co., Springfield, Mass.
Sell-O-Face	Cellophane window bags	Thomas M. Royal & Co., Phila., Pa.
Sell-O-Royal	Cellophane bags and sheets	Thomas M. Royal & Co., Phila., Pa.
Selmor	Display stands	Hinde & Dauch Paper Co., Sandusky, O.
Semi-Seal	Cellophane glued to back-board	Milprint, Inc., Milwaukee, Wis.
Senior Krimper	Light weight jaw type krimper for bags	Pack-Rite Machine Corp., Milwaukee, Wis.
Sentry-Seal	Closure	Owens-Illinois Glass Co., Toledo, O.
Serpette	Box paper	Kupfer Bros. Co., New York, N. Y.
Seybold	Paper cutters	Harris-Seybold-Potter Co., Dayton, O.
Seybold Precision	Die presses	Harris-Seybold-Potter Co., Dayton, O.
Seymour	Decorated metal containers	Seymour Products Co., Seymour, Conn.
Shadotone	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Shadowgraph	Overweight - underweight scales	The Exact Weight Scale Co., Columbus, O.
Shadowplaid	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Shear Sheen	Mica box papers	Hazen Paper Co., Holyoke, Mass.
Shelfalloy	Alternate collapsible tube metal	New England Collapsible Tube Co., Chicago, Ill.
Shelfield Process	Collapsible tubes	New England Collapsible Tube Co., Chicago, Ill.
Sheipco 4 Star	Silver chests for packaging silverware	Henry H. Sheip Mfg. Co., Phila., Pa.
Shellback	Double shell caps	Anchor Hocking Glass Corp., Lancaster, O.
Shell-Tint	Transparent tint over portions of transparent cellulose wraps	Shellmar Products Co., Mt. Vernon, O.
Shell-Glo	Clear transparent laminated cellulose	Shellmar Products Co., Mt. Vernon, O.
Shell-Pax	Transparent cellulose containers	Shellmar Products Co., Mt. Vernon, O.
Shell-Pil	Printed laminated cellulose	Shellmar Products Co., Mt. Vernon, O.
Shell-Vue	Transparent gummed acetate posters	Shellmar Products Co., Mt. Vernon, O.
SHH	Single head cappers	U. S. Bottlers Machinery Co., Chicago, Ill.
Shoksorb	Indented packing paper	Schmidt & Ault Paper Co., York, Pa.
Shopak	Transparent acetate containers	Shaw Paper Box Co., Meriden, Conn.
Showbox	Rigid containers	Central States Paper & Bag Co., St. Louis, Mo.
Showmaster	Electric turntables	Motion Displays, Inc., Bklyn, N. Y.
Shy-Nee	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Signodes	Steel strapping	Signode Steel Strapping Co., Chicago, Ill.
Silica Gel	Moisture absorbent chemical	Davison Chemical Corp., Baltimore, Md.
Silk Sheen	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Silray	Silver coated paper	The Marvellum Co., Holyoke, Mass.
Silvalum	Silver embossed paper	Springfield Coated Paper Corp., Camden, N. J.
Silvener	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Silver Beams	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Silver Foil 1941	Metallic coated, silver, plain and embossed	Louis Dejonge & Co., New York, N. Y.
Silverglass	Silver print paper	The Marvellum Co., Holyoke, Mass.
Silver King	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Silverlink	Roller chain	Link-Belt Co., Chicago, Ill.
Silver Mosaic	Brightwood kid finish papers	Holyoke Card & Paper Co., Springfield, Mass.
Silver Plaid	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Silverseal	Colored specialty tape	Gummed Tape & Devices Co., Bklyn, N. Y.
Silverseal	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Silverstitch	Stapling wire	Acme Steel Co., Chicago, Ill.
Silverstitcher	Stitching machine	Acme Steel Co., Chicago, Ill.
Silverstreak	Silent chain	Link-Belt Co., Chicago, Ill.
Silverstone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Silverstone	Metallized cellulose ribbon	Fibre Cord Co., New York, N. Y.
Sil-Vor-Plate	Aluminum bronze ink	Geo. H. Morrill Co., Div. General Printing Ink Corp., New York, N. Y.
Slim-Pac	Folding boxes shipped flat	Paper Package Co., Indianapolis, Ind.
Simplex	Wire staples	Acme Staple Co., Camden, N. J.
Simplex	Packages sealers, gummed tape	Better Packages, Inc., Shelton, Conn.
Simplex	Pie and cake container	Milprint, Inc., Milwaukee, Wis.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Simplex	Folding paper boxes	Simplex Paper Box Corp., Lancaster, Pa.
Simplex Hi-Speed	Bag making machine	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Single	Labeling machines & accessories	The Liquid Carbonic Corp., Chicago, Ill.
Single Plate	Filter	Karl Kiefer Machine Co., Cincinnati, O.
Singletin	One-use collapsible tube	Victor Metal Products Corp., Bklyn, N. Y.
Singl-Vu	Window cartons	Rossotti Lithographing Co., Inc., N. Bergen, N. J.
Skytogen	Box paper	Kupfer Bros. Co., New York, N. Y.
Skystone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Slak-Tite	Closure for slack filled paper bags	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Slant Side	Sloping side folding box	Michigan Carton Co., Battle Creek, Mich.
SlideLid	Tablet boxes	Columbia Specialty Co., Inc., Baltimore, Md.
Smart Set	Salt and pepper shakers	Owens-Illinois Glass Co., Toledo, O.
Smithcraft	Metal wood leatherette boxes and displays	The S. K. Smith Co., Chicago, Ill.
Snec-Pak	Corrugated basket container for cakes	The Ashtabula Corrugated Box Co., Ashtabula, O.
Snake Tape	Gummed wrapping tape	Angier Corp., Framingham, Mass.
Snap-Loks	Attaching device embedded in tag	Dennison Mfg. Co., Framingham, Mass.
Snap-on	Cap for application to reuse tumblers	Sterling Seal Co., Erie, Pa.
Snopaque	Opaque, white glassine	Riegel Paper Corp., New York, N. Y.
Snowcap	Lining	Bradner Smith & Co., Chicago, Ill.
Snowdrift	Greaseproof paper	Rhineland Paper Co., Rhineland, Wis.
Snowflake	Padding	American Lace Paper Co., Milwaukee, Wis.
Snowflake and Star	Box covering paper	Holyoke Card & Paper Co., Springfield, Mass.
Snow White Litho	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Snowwhite Silkite	Box wrap	Fitchburg Paper Co., Fitchburg, Mass.
Solac	Cellulose cement	Mass & Waldstein Co., Newark, N. J.
Solar	Box covers	District of Columbia Paper Mills, Inc., Washington, D.C.
Soldertite	Can spouts	Standard Specialty & Tube Co., New Brighton, Pa.
Solidry	Inks and varnishes	Pope & Gray, Inc., New York, N. Y.
Sonettes	Box paper	Kupfer Bros. Co., New York, N. Y.
Sorbolite	Light proof board	Waldorf Paper Products Co., St. Paul, Minn.
Sorting Scale	Automatic continuous check-weighing and sorting scale	Merrick Scale Mfg. Co., Passaic, N. J.
Spade-Pac	Ice cream pail	Bloomer Bros. Co., Newark, N. J.
Speediseal	Tablet tape	Wayne Co., New York State Gummed Tape & Devices Co., Bklyn, N. Y.
Speed-Limit	Printing inks	International Printing Ink Div. of Interchemical Corp., New York, N. Y.
Spee-D-Mark	Cellulose bags	U. S. Envelope Co., Springfield, Mass.
Speedweigh	Over and under scale for fast packing operations	Toledo Scale Co., Toledo, O.
Speed-Wrap	Automatic sheeting and gluing machine	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Speedway	Motors and display turntables	Speedway Mfg. Co., Cicero, Ill.
Sphinx	Adhesive	Arabol Mfg. Co., New York, N. Y.
Spiralon	Flint and foil box papers	Hazen Paper Co., Holyoke, Mass.
Spongflex	Flexible non-warp glues	Paisley Products, Inc., Chicago, Ill., also New York, N. Y.
Sport-Art	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Spot Lite Sprague	Glassine wrappers Canning machinery	Milprint, Inc., Milwaukee, Wis. Food Machinery Corp., Sprague-Sells Div., Hooperston, Ill.
Springtime Line	Box cover paper	Matthias Paper Corp., Phila., Pa.
Spun-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Square-Pak	Paraffined ice cream container	The Menasha Products Co., Div. Marathon Paper Mills Co., Menasha, Wis.
Square Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Square-Tex	Printed box paper	The Marvellum Co., Holyoke, Mass.
Sta-Ahead	Hat stickers	Gummed Tape & Devices Co., Bklyn, N. Y.
Sta-Fresh	Waxed glassine bags	Oneida Paper Products, Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Stainless	Metal foils	Keller-Dorian Corp., New York, N. Y.
Standard	Labeling machine and accessories	Liquid Carbonic Corp., Chicago, Ill.
Standee	Automatic multiwall paper bags	Union Bag & Paper Corp., New York, N. Y.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Stapak Drum	Fibre drum	The Container Co., Van Wert, O.
Staplecraft	Hand, foot, motorized stapling machines	Acme Staple Co., Camden, N. J.
Star	Adhesive	Bingham Bros. Co., New York, N. Y.
Star and Step	Box covers	District of Columbia Paper Mills, Inc., Washington, D.C.
Star Brand	Liquid adhesives	Bingham Bros. Co., New York, N. Y.
Stardust	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Star Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Staybound	Cold process padding gum	The Commercial Paste Co., Columbus, O.
Stavstak	Center spot crowns	Ferdinand Gutmann & Co., Bklyn, N. Y.
Staytite	Gummed stay tape	Bradner Smith & Co., Chicago, Ill.
Steelstrap	Steel strapping	Acme Steel Co., Chicago, Ill.
Stek-O	Powder, general adhesive purposes	Clark Stek-O Corp., Rochester, N. Y.
Sterillined	Inner lined containers	The Interstate Folding Box Co., Middletown, O.
Sterling Tread	Gummed paper tape	The Gummed Products Co., Troy, O.
Stikfast	Label pasters	Diagraph-Bradley Stencil Machine Corp., St. Louis, Mo.
Streamer Bows	Pre-tied cellulose bows	Stark Bros. Ribbon Corp., New York, N. Y.
Stretchap	Wrapping machine	Stokes & Smith Co., Frankford, Pa.
Stripe & Pine	Fancy printed Christmas papers	Louis Dejonge & Co., New York, N. Y.
Sturdite	Leather cloth	Holliston Mills, Inc., Norwood, Mass.
Style-Curve	Corrugated display material	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Styron	Polystyrene molding granules	The Dow Chemical Co., Midland, Mich.
SUco	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Suedette	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Sullmanco	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Sunallo	Tin substitute for tubes	Sun Tube Corp., Hillside, N. J.
Sunburst	Wide mouth food ware	Armstrong Cork Co., Lancaster, Pa.
Sunco	Dry colors	Sun Chemical & Color Co., Div. General Printing Ink Corp., Harrison, N. J.
Sunex	Transparent sheet	American Phenolic Corp., Chicago, Ill.
Sunrise	Sealing tapes	McLaurin-Jones Co., Brookfield, Mass.
Sunshine	Box cover paper	Matthias Paper Corp., Phila., Pa.
Sunshine	Box paper	Bradner Smith & Co., Chicago, Ill.
Super Cell	Egg cartons (2 x 6)	The Interstate Folding Box Co., Middletown, O.
Super Cell 2-in-1	Egg carton	The Interstate Folding Box Co., Middletown, O.
Super-Gloss	White ivory embossed and plain papers	The Marvellum Co., Holyoke, Mass.
Superkleen	Bottle washers	The Liquid Carbonic Corp., Chicago, Ill.
Superseal	Heat sealing glassine	Hartford City Paper Co., Hartford City, Ind.
Super Seal	Printed bread wrappers	Menasha Products Co., Menasha, Wis.
Super-Seal	Leakproof cellophane bags	Munson Bag Co., Cleveland, Ohio.
Super-Seal	Glass vacuum jar	Super-Seal Container Corp., Washington, D. C.
SUPerset	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Supreme Blacks	Printing inks (lithographic)	E. J. Kelly Co., Kalamazoo, Mich.
Sure Shot	Wire staples	Acme Staple Co., Camden, N. J.
Susan	Rayon acetate fusedge ribbon	Freydberg Bros.-Strauss, Inc., New York, N. Y.
SUTILITY	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
SUTone	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
SUVaneer	Printing inks	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Sweepstakes	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Sweetone	Geo. H. Sweetnam products	Geo. H. Sweetnam, Inc., Cambridge, Mass.
Sylphcase	Artificial transparent casings for meats	Sylvania Industrial Corp., New York, N. Y.
Sylph-Flake	Sylphrap confetti	Sylvania Industrial Corp., New York, N. Y.
Sylphrap	Transparent cellulose sheeting	Sylvania Industrial Corp., New York, N. Y.
Sylphseal	Secondary closures—bottle bands	Sylvania Industrial Corp., New York, N. Y.
Sylph-Thin	Artificial transparent casings for meats	Sylvania Industrial Corp., New York, N. Y.
Sylvania	Sylvania cellophane and other products	Sylvania Industrial Corp., New York, N. Y.

Complete addresses of companies listed appear on pages 622-630

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Synchro Ink	Printing inks, lithographic supplies	International Printing Ink, Div. Interchemical Corp., New York N. Y.
Syntron	Weighing machines Vibrators and packer	Syntron Co., Homer City, Pa.
T.B.&B.	Lithographed papers	Trautmann, Bailey & Blampsey, Art & Box Wrap Dept., New York N. Y.
TL Type	Liquid bottling machine	Karl Kiefer Machine Co., Cincinnati, O.
Tamper-Proof	Rupturing band amper-proof	Aluminum Seal Co., New Kensington, Pa.
Tap-A-Flow	Closure dispenser	Federal Tool Corp., Chicago, Ill.
Tapplit	Liquid dispensers	Food Dispenser Co., Hartford, Conn.
Tarcette	Box paper	Kupfer Bros. Co., New York, N. Y.
Taylor Made	Paper boxes	Taylor Box Co., Providence, R. I.
Tayper	Tape moistening machine	Nashua Package Sealing Co., Inc., Nashua, N. H.
Telestop	Dispensing box	National Folding Box Co., New Haven, Conn.
Television	Metal and cellulose acetate cans	Geo. V. Clark Co., Inc., L. I. C., N. Y.
Tell-U-Tags	Marking tags	Dennison Mfg. Co., Framingham, Mass.
Tenite	Cellulose acetate molding compound	Tennessee Eastman Corp., Kingsport, Tenn.
Tenite I	Cellulose acetate molding composition	Tennessee Eastman Corp., Kingsport, Tenn.
Tenite II	Cellulose acetate butyrate molding composition	Tennessee Eastman Corp., Kingsport, Tenn.
Texol	Box covering, pyroxylin-coated fabric	Farrington Mfg. Co., Boston, Mass.
Texkraft	Lacquered kraft paper	Textileather Corp., Toledo, O.
Texrope	Multiple V-belt drive	Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Textileather	Lacquered fabric	Textileather Corp., Toledo, O.
Textile Prints	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Textifold	Lacquered rag paper	Textileather Corp., Toledo, O.
Textolite	Compression and injection molded plastics	General Electric Co., Plastics Dept., Pittsfield, Mass.
Thermium	Heat sealing paper and tape	Seal, Inc., Shelton, Conn.
Thermo	Tin printing inks	Crescent Ink & Color Co. of Pa., Phila., Pa.
Thermocurl	Machine, beading ends of plastic cylinders	Taber Instrument Co., N. Tonawanda, N. Y.
Thermodraw	Machine, drawing containers from sheet plastic	Taber Instrument Co., N. Tonawanda, N. Y.
Thermofold	Creasing and folding sheet plastic	Taber Instrument Co., N. Tonawanda, N. Y.
Thermofold	High relief plastic material	Chaspec Mfg. Co., Inc., New York, N. Y.
Thermo-Matic	Heat-seal label applicator	New Jersey Machine Corp., Hoboken, N. J.
Thermo-Phane	Highly moisture resistant, heat sealable, laminated paper	Interstate Folding Box Co., Middletown, O.
Thermoseal	Thermoplastic closure wraps, bags, liners	Beni. C. Betner Co., Devon, Pa.
Therm-O-Top	Bags with heat sealing application at top	Thomas M. Royal & Co., Phila., Pa.
Thin-Wrap	Wrapping machine for thin packages	Miller Wrapping & Sealing Machine Co., Chicago, Ill.
Thres in One	Steel strapping tightening, sealing, and cutting tool	Stanley Works, New Britain, Conn.
Throway	No deposit, no return throw-away beer bottles	Anchor Hocking Glass Corp., Lancaster, O.
Ticco	General	Triangle Ink & Color Co., Inc., Bklyn, N. Y.
Tie-Tie	Gift wrappings, ribbons, seals	Chicago Printed String Co., Chicago, Ill.
Tiger Stay	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Timely Suggestions	Box paper	Kupfer Bros. Co., New York, N. Y.
Tinick	Tin and zinc coated paper and boards	Keller-Dorian Corp., New York, N. Y.
Tinaley	Display carton	Robert Gair Co., Inc., New York, N. Y.
Tin Tak	Tin labeling glue	The F. G. Findley Co., Milwaukee, Wis.
Tiny Midge	Static eliminator	The Simco Co., Phila., Pa.
Tipplit	Milk bottle cap	Sealright Co., Inc., Fulton, N. Y.
Tip Off	Closure	Owens-Illinois Glass Co., Toledo, O.
Title-Lok	Cellophane	Oneida Paper Products, Inc., New York, N. Y., also Continental Bag Specialties Corp., New York, N. Y.
Titelok	Cylindrical paper container	Sutherland Paper Co., Kalamazoo, Mich.
Title-Top	Fresh fish box	National Folding Box Co., New Haven, Conn.
Tone-Craft	Display, corrugated	Sherman Paper Products Corp., Newton Upper Falls, Mass.
Tonecote	Moisture resistant coating	Brooks Bank Note Co., Springfield, Mass.
Topmost	Wire-handle paper pail (tin-seal)	Sutherland Paper Co., Kalamazoo, Mich.
Topper	Bottle carriers	Container Corp. of America, Chicago, Ill.
Traco	Plain and printed cellophane	Traver Corp., Chicago, Ill.
Traco-Pak	Cellophane liners for cartons	Traver Corp., Chicago, Ill.
Tran-Cal-Seal	Cellulose tape	Gummed Tape & Devices Co., Bklyn, N. Y.
Transcan	Transparent sulphite self-sealing wrappers	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Transel	Printed embossed transparent cellulose	The Marvellum Co., Holyoke, Mass.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Transitone	Discoloration coated	Bradner Smith & Co., Chicago, Ill.
Transowrap	Transparent cellulose sheeting	Transolene Co., Barrington, Ill.
Transpak	Chipboard container	Transcontinental Container Corp., Corona, N. Y.
Transplastics	Transparent plastics process	Waterbury Button Co., Plastics Div., Waterbury, Conn.
Transtate Bags	Combination cellophane and glassine bags	The Interstate Folding Box Co., Middletown, O.
Transwrap	Automatic packaging machine	Stokes & Smith Co., Frankford, Phila., Pa.
Tre-Pac	Refrigerator ice cream packages	Bloomer Bros. Co., Newark, New York State
Trapcote	Grease resistant coating	Brooks Bank Note Co., Springfield, Mass.
Traversheen	Decorative wrappers and bands	Traver Corp., Chicago, Ill.
Tray-Pax	Transparent cellulose sheet with rigid base or back	Shellmar Products Co., Mt. Vernon, O.
Tredonia	Moistureproof and greaseproof cartons	Fibreboard Products, Inc., San Francisco, Calif.
Tredonia	Moistureproof and greaseproof packages	Grant Paper Box Co., Pittsburgh, Pa.
Tredonia Board	Moistureproof and greaseproof boxboard	The Butterfield-Barry Co., Inc., New York, N. Y.
Trees, Angel, Deer	Fancy-printed Christmas papers	Louis Dejonge & Co., New York, N. Y.
Tricolette	Box paper	Kupfer Bros. Co., New York, N. Y.
Triple Lock	Triple strength bottom cellophane bag	The Dobeckmun Co., Cleveland, O.
Triple Seal	Closure	Owens-Illinois Glass Co., Toledo, O.
Triple-Tec	Double corrugated for packing	Sherman Paper Products Co., Newton Upper Falls, Mass.
Tripletite	Special friction top paint can	Continental Can Co., New York, N. Y.
Triplex	Labeling machines	The Liquid Carbonic Corp., Chicago, Ill.
Tri-Seal	Metal cigar wraps	Reynolds Metals Co., Richmond, Va.
Tri-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
Trilect	Moisture-vaporproof cellulose film	The Dobeckmun Co., Cleveland, O.
Trojan	Gummed paper tape	The Gummed Products Co., Troy, O.
Trophy	Flints and mica	Bradner Smith & Co., Chicago, Ill.
Tru-Art	Pictorials, food—illustrations, labels and cartons	Rossotti Lithographing Co., Inc., N. Bergen, N. J.
Tru-Hue	Patented window and counter displays	James Andrew DeNina, New York, N. Y.
Tru-Pak	Satchel-bottom bags	Cupples-Hesse Corp., St. Louis, Mo.
Trutite	Key opening vacuum can	Continental Can Co., New York, N. Y.
Tru-Tone	Food pictorials for canned goods labels	The U. S. Printing & Lithograph Co., Cincinnati, O.
Tru-Vu	Pictorials, food—illustrations, labels and cartons	Rossotti Lithographing Co., Inc., N. Bergen, N. J.
Tuffy	Nursing bottle (heat resistant glass)	Brooklyn Glass Co., Inc., Brooklyn, Pa.
Tutone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Twinkle-Sheen	Embossed mica paper	Hazen Paper Co., Holyoke, Mass.
250 Gum	Adhesives, starch derived	Stein, Hall Mfg. Co., Chicago, Ill.
TwoTone	Cellophane ribbon	Fibre Cord Co., New York, N. Y.
Two View	Label, food products	Muirson Label Co., Inc., Bklyn, N. Y.
Two Way	Labels for cans and glass	Muirson Label Co., Inc., Bklyn, N. Y.
2X-10	Adhesives, starch derived	Stein, Hall Mfg. Co., Chicago, Ill.
U.S.	Bottling machinery	U. S. Bottlers Machinery Co., Chicago, Ill.
U1	Anti-tarnish wadding for silversmiths	Union Wadding Co., Pawtucket, R. I.
Ullmanine	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Ultroaque	Printing ink	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Unifoil	Light gauge metal mounted paper backing	Reynolds Metals Co., Richmond, Va.
Unifold	One-piece folding garment box	Gardner-Richardson Co., Middletown, O.
Union	Point-of-sale displays	Union Steel Products Co., Albion, Mich.
Uniplex	Lug cap	National Seal Corp., Bklyn, N. Y.
Uniseal	Can sealing compound	The Max Ams Machines Co., Bridgeport, Conn.
Uniseal-Hermo Oil-proof	Sealing fluid for can ends	The Max Ams Machine Co., Bridgeport, Conn.
Unishell	One piece cap substitute for double shell cap	National Seal Corp., Bklyn, N. Y.
Unishell	Special one-piece screw cap	Continental Can Co., New York, N. Y.
Unitainer	One dose containers	Sun Tube Corp., Hillside, N. J.
United	Box covering and greeting card paper	United Mfg. Co., Springfield, Mass.
Unit Load	Steel band freight bracing method	Acme Steel Co., Chicago, Ill.
Universal	Tablet counting and filling machine	Ivers-Lee Co., Newark, N. J.
	Cellophane tube making machine	

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Universal	Conveyor chain	Link-Belt Co., Chicago, Ill.
Universal	Bottle washers	The Liquid Carbonic Corp., Chicago, Ill.
Universal-Kottner	Cotton wedding machine	Consolidated Packaging Machinery Corp., Buffalo, N. Y.
Upaco	All formulations	Union Paste Co., Hyde Park, Mass.
U-Press-It	Special opening pouring spout and cap	Continental Can Co., New York, N. Y.
Utility	Small utility volumetric filler	Triangle Package Machinery Co., Chicago, Ill.
Vacutop	Applicator closures, self feeding	Double Duty Products, Inc., Cleveland, O.
Val Hue	Fused cut edge acetate rayon ribbon	Wm. E. Wright & Sons Co., West Warren, Mass.
Valvo	Collapsible tubes	National Collapsible Tube Co., Providence, R. I.
Vanity Line	Box cover paper	Matthias Paper Corp., Phila., Pa.
Vapetex	Thermoplastic coated board	The Interstate Folding Box Co., Middletown, O.
Vapometer	Water tester	Thwing-Albert Instrument Co., Phila., Pa.
Vaporin	Letterpress quick drying ink	International Printing Ink Div. of Interchemical Corp., New York, N. Y.
Vapossal	Glossine paper lacquer coated	Westfield River Paper Co., Inc., Russell, Mass.
Vaposet	Moisture-set inks	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Vari-Pitch	Variable speed V-belt transmission	Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Vari-Visco	Filling machine for viscous materials	Karl Kiefer Machine Co., Cincinnati, O.
Velboard	Velour box or chip board	Cellusuede Products, Inc., Rockford, Ill.
Velmar	Waterproof antique coated papers	The Marvellum Co., Holyoke, Mass.
Velmat	Greeting card paper	Springfield Coated Paper Corp., Camden, N. J.
Velmo	Box paper	The Marvellum Co., Holyoke, Mass.
Velvet Chintz	Printed dull coated paper	Hampden Glazed Paper & Card Co., Holyoke, Mass.
Versailles Satintone	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Vibro	Vibrating packers	B. F. Gump Co., Chicago, Ill.
Vichrome	Industrial finishes	Ault & Wiborg Corp., New York, N. Y.
Victoria	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Victorian Floral	Fancy paper	Louis Dejonge & Co., New York, N. Y.
Victor Tape	Printed advertising tape	Chicago Printed String Co., Chicago, Ill.
Victory	Rayon cut edge ribbon	Freydberg Bros.-Strauss, Inc., New York, N. Y.
View Pac	Transparent bags, envelopes, rigid boxes	U. S. Envelope Co., Springfield, Mass.
Vigorette	Box paper	Kupfer Bros. Co., New York, N. Y.
Viking	Cellulose window gluing combining machine	E. G. Staude Mfg. Co., St. Paul, Minn.
Vinicote	Special internal coatings for collapsible tubes	New England Collapsible Tube Co., Chicago, Ill.
Vinylite	Transparent, translucent, or opaque plastic sheets, coated paper, molding compounds, surface coating resins	Union Carbide & Carbon Corp., New York, N. Y.
Virkotype	Raised printing compounds	Wood, Nathan & Virkus Co., Inc., Racine, Wis.
Visco	Filling machine for viscous materials	Karl Kiefer Machine Co., Cincinnati, O.
Visinet	Open-mesh bags	Benis Bro. Bag Co., St. Louis, Mo.
Visitainer	Transparent container	Old Dominion Box Co., Charlotte, N. C.
Visowrap	Cellophane and paper window wrapper	The Dobeckmun Co., Cleveland, O.
Visualize	Window and transparent bags	Paramount Paper Products Co., Inc., Phila., Pa.
Vol-U-Meter	Semi-automatic drum filling valve	The Vol-U-Meter Co., Buffalo, N. Y.
Vol-U-Meter Junior	Can filling machine	The Vol-U-Meter Co., Buffalo, N. Y.
Vortex Cups	Paper drinking cups and containers	Dixie-Vortex Co., Easton, Pa.
Vue Lite	Translucent plastic sheets	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Vuepak	Rigid transparent packaging materials	Monsanto Chemical Co., Plastics Div., Springfield, Mass.
Webcoat	Coated board	Container Corp. of America, Chicago, Ill.
Welsello	Cellophane ribbons	The Walser Mfg. Co., Inc., Clifton, N. J.
Ware Foils	Coated box coverings	McLaurin-Jones Co., Brookfield, Mass.
Waregold-Ware	Gold and platinum box coverings	McLaurin-Jones Co., Brookfield, Mass.
Warelac	Coated box coverings	McLaurin-Jones Co., Brookfield, Mass.
Wareplatinum	Platinum box covering	McLaurin-Jones Co., Brookfield, Mass.
Ware Super Colors	Coated box coverings	McLaurin-Jones Co., Brookfield, Mass.
Werncraft	Set up and folding boxes	The Warner Bros. Co., Bridgeport, Conn.

TRADE NAME	NATURE OR TYPE OF PRODUCT	COMPANY & ADDRESS
Werncraft	Boxes and cartons	The Warner Bros. Co., Bridgeport, Conn.
Warp-Proof	Flexible glue	The F. G. Findley Co., Milwaukee, Wis.
Washington Brilliant	Box covers	District of Columbia Paper Mills, Inc., Washington, D. C.
Waterlite	Waterproof papers	Reford Paper Co., Milwaukee, Wis.
Wavee	Embossed parchment	Geo. H. Sweetnam, Inc., Cambridge, Mass.
Waxheen	Highly transparent and glossy cake and candy wrapper	Dixie Wax Paper Co., Inc., Dallas, Texas
Weavette	Box paper	Kupfer Bros. Co., New York, N. Y.
Weightometer	Automatic conveyor scale	Merrick Scale Mfg. Co., Passaic, N. J.
Waklite	Coated and foil box papers	Hazen Paper Co., Holyoke, Mass.
Werthy	Ribbons	W-E-R Ribbon Corp., New York, N. Y.
Wasca	Copper	Scientific Filter Co., New York, N. Y.
Whalehide	Crate liners	Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich.
Wheeling	Steel drums	Wheeling Corrugating Co., Wheeling, Va.
Whirlwind	Electric label pasteur and screw capper	Scientific Filter Co., New York, N. Y.
Whitehall	Dispensers	Food Dispenser Co., Hartford, Conn.
Whiz-Tape	Narrow opening tape inserted beneath transparent wrappers	Shellmar Products Co., Mt. Vernon, O.
Williamson	Adhesives	Williamson Adhesives, Inc., Chicago, Ill.
Williams Stripe	Box covering paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Wind-O-Band	Cellulose bands	Armstrong Cork Co., Lancaster, Pa.
Windocel	Cellophane window cartons	E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.
Windorap	Combination transparent and opaque wrappers	Brooks & Porter, Inc., New York, N. Y.
Windoseals	Milk bottle hoods	Newark Paraffine & Parchment Paper Co., Newark, N. J.
Winnerwite	Box cover paper	Reynolds Metals Co., Richmond, Va.
Wireless	Folded oyster and food pail	Matthias Paper Corp., Phila., Pa.
Wiretrap	Round wire strap	Bloomer Bros. Co., Newark, New York State
Wizard	Marking compound	Acme Steel Co., Chicago, Ill.
Wizard Icaproof	Glue for labeling bottles	Markem Machine Co., Keene, N. H.
Wiz-Wite	Paper, for box wraps and printing	Midland Glue Products Co., Detroit, Mich.
Wonder	Printing inks, lithographic supplies	Matthias Paper Corp., Phila., Pa.
Wonpresum	Printing ink	International Printing Ink, Div. Interchemical Corp., New York, N. Y.
Woodcraft	Woodgrain box paper	Sigmund Ullman Co., Div. General Printing Ink Corp., Bronx, N. Y.
Woodcraft	Box covering paper	The Marvellum Co., Holyoke, Mass.
Woodette	Box paper	Chas. W. Williams & Co., Inc., New York, N. Y.
Worlbester	Hand mixer	Kupfer Bros. Co., New York, N. Y.
World	Automatic labelers	Na-Mac Products Corp., Los Angeles, Calif.
World's Fair	Box covering paper	Economic Machinery Co., Worcester, Mass.
Wotta Blacks	Printing inks (Letterpress)	Chas. W. Williams & Co., Inc., New York, N. Y.
Wrap-Ade	Bag making machinery and crimpers	E. J. Kelly Co., Kalamazoo, Mich.
Wrap-O-Matic	Wrapping machine for small irregular products	Wrap-Ade Machine Co., Inc., Newark, N. J.
Wright	Paper drills and punches	Modern Equipment Corp., Delaware, O.
		Harris-Seybold-Potter Co., Dayton, O.
"X" Base	Inks for raised printing	Wood, Nathan & Virkus Co., Inc., Racine, Wis.
Yankee Nests	Nest of lock corner wooden boxes	New England Box Co., Greenfield, Mass.
Yuletide	Box paper	Kupfer Bros. Co., New York, N. Y.
Zapon	Imitation leather and coatings	Atlas Powder Co., Zapon-Keratal Div., Stamford, Conn.
Zephyr	Carton gluer	E. G. Staude Mfg. Co., St. Paul, Minn.
Zephyr	Tubing for loaves	The Visking Corp., Chicago, Ill.
Zero-Seal	Waxed paper	The Menasha Products Co., Div. Marathon Paper Mills Co., Menasha, Wis.
Zip Tape	Cellophane package opening tape	The Dobeckmun Co., Cleveland, O.
Zip-Wrap	Cellophane sheet with pull tape attached	The Dobeckmun Co., Cleveland, O.

Complete addresses of companies listed appear on pages 622-630

PACKAGING CATALOG

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Alphabetical List of All Manufacturers and Addresses

A

Ability Mold & Die Works, 1237 N. California, Chicago, Ill.
Able Machine & Tool Works, 20 W. 22nd St., New York, N. Y.
Accessories Mfg. Co., 127 E. 31st St., Kansas City, Mo.
Accurate Molding Corp., 116-132 Nassau St., Bklyn, N. Y.
Ace Carton Corp., 5800 W. 51st St., Chicago, Ill.
Ackerman Plastic Molding, 986 E. 200th St., Cleveland, Ohio
Acme Burlap Bag Co., 42 Emerson Place, Bklyn, N. Y.
Acme Folding Box Co., 200 Lynch St., St. Louis, Mo.
Acme Paper Box Co., 5950 S. State St., Chicago, Ill.
Acme Printing Ink Co., 1315 W. Congress St., Chicago, Ill.
Acme Staple Co., 1643-47 Haddon Ave., Camden, N. J.
Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
Acragas Co., The, 1805 14th St., Santa Monica, Calif.
Adams Paper Co., Wells River, Vt.
Addison Lithographing Co., 245 Hollenbeck St., Rochester, N. Y.
Adler, H. M. & Co., 305 S. Sharp St., Baltimore, Md.
Adler Engineering Co., 295 Main St., Hackettstown, N. J.
Advance Molding Corp., 54 W. 21st St., New York, N. Y.
Advanced Closures Corp., 46th & First Aves., Bklyn, N. Y.
Advertising Metal Display Co., 822 W. Washington Blvd., Chicago, Ill.
Aids, Inc., 1220 Broadway, New York, N. Y.
Ajax Bottle Cap Corp., 1226 Flushing Ave., Bklyn, N. Y.
Albert Paper Box Co., Inc., 360 Furman, Bklyn, N. Y.
Albia Box & Paper Co., Troy, N. Y.
Alden Products Co., 117 N. Main St., Brockton, Mass.
Alderman Paper Box Corp., 31 Exchange St., Rochester, N. Y.
Aldine Paper Co., Inc., 373 Fourth Ave., New York, N. Y.
Aldrich Pump Co., The, 12 Pine St., Allentown, Pa.
Alexander, Jerome, 50 E. 41st St., New York, N. Y.
All American Aircraft Prods., Inc., 1350 E. Anaheim, Long Beach, Calif.
Allen, Arthur S., 527 Fifth Ave., New York, N. Y.
Allied Barrel Corp., North Seneca St., Oil City, Pa.
Allied Plastics Co., 5225 Wilshire Blvd., Los Angeles, Calif.
Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee, Wis.
Allvue Container, Inc., 169 Franklin Ave., Bklyn, N. Y.
Alsop Engineering Corp., Milldale, Conn.
Alton Box Board Co., Alton, Ill.
Aluminum Co. of America, Gulf Bldg., Pittsburgh, Pa.
Aluminum Container Corp., Fulton, N. Y.
Aluminum Goods Mfg. Co., Manitowoc, Wis.
Aluminum Seal Co., New Kensington, Pa.
Alvey-Ferguson Co., The, 40 Disney St., Oakley, Cincinnati, Ohio
Amdeco, 122 Fifth Ave., New York, N. Y.
American Aluminum Ware Co., 368-378 Jelliff Ave., Newark, N. J.
American Box Board Co., 470 Market St., S. W., Grand Rapids, Mich.
American Can Co., 230 Park Ave., New York, N. Y.
American Coating Mills, Inc., Elkhart, Ind.
American Colortype Co., 1151 West Roscoe St., Chicago, Ill.
American Cyanamid Co., Plastics Div., 30 Rockefeller Plaza, New York, N. Y.
American Decalcomania Co., 4326-38 Fifth Ave., Chicago, Ill.
American Denture Corp., 536 S. E. 6th Ave., Portland, Ore.
American Excelsior Corp., 1000 N. Halsted St., Chicago, Ill.
American Folding Box Co., 1901 Washington Ave., St. Louis, Mo.
American Hard Rubber Co., 11 Mercer St., New York, N. Y.
American Insulator Corp., New Freedom, Pa.
American Label Cutting Co., 230 W. 17th St., New York, N. Y.
American Lace Paper Co., 4425 N. Port Washington Ave., Milwaukee, Wis.
American Molded Products Co., 1753 N. Honore St., Chicago, Ill.
American Molding Co., 355 Fremont St., San Francisco, Calif.

American National Bag & Burlap Co., 343 Kent Ave., Bklyn, N. Y.
American Paper Bottle Co., 1813 Collingwood Blvd., Toledo, Ohio
American Paper Goods Co., The, 449 Main St., Kensington, Conn.
American Perforator Co., The, 625 Jackson Blvd., Chicago, Ill.
American Phenolic Corp., 1830 S. 54th Ave., (Cicero P. O.), Chicago, Ill.
American Plastics Corp., 225 W. 34th St., New York, N. Y.
American Printing Ink Co., Div. General Printing Ink Corp., 2314 W. Kinzie St., Chicago, Ill.
American Products Mfg. Co., 8127-33 Oleander St., New Orleans, La.
American Sealcone Corp., 116 E. 27th St., New York, N. Y.
American Seal-Kap Corp., 11-05-44th Dr., Long Island City, N. Y.
American Star Cork Co., Inc., 175 N. 9th St., Bklyn, N. Y.
American Tissue Mills, 12 Crescent St., Holyoke, Mass.
American Tri-State Paper Box Co., 808-17th Ave., N. Nashville, Tenn.
Ames Bag Co., Selma, Ala.
Ames Harris Neville Co., 2800-17th St., San Francisco, Calif.
Amos-Thompson Corp., Edinburgh, Ind.
Ams. Max Machine Co., The, Scofield Ave., Bridgeport, Conn.
Amsco Packaging Machinery, Inc., 31-31-48th Ave., Long Island City, N. Y.
Analytical Laboratory, The, 921 Bergen Ave., Jersey City, N. J.
Anchor Hocking Glass Corp., 109 N. Broad St., Lancaster, Ohio
Andersen, A. J., 429 W. Superior St., Chicago, Ill.
Anderson Box & Basket Co., 230 Fifth Ave., New York, N. Y.
Andrews, O. B. Co., Chattanooga, Tenn.
Andrews, P. L. Corp., 78th St. & Cooper Ave., Ridgewood Sta., Bklyn, N. Y.
Angelus Paper Box Co., 751 N. Broadway, Los Angeles, Calif.
Angier Corp., Framingham, Mass.
Apex Paper Box Corp., 2318 S. Western Ave., Chicago, Ill.
Arabol Mfg. Co., The, 110 E. 42nd St., New York, N. Y., Chicago, Ill., San Francisco, Calif.
Arenco Machine Co., Inc., The, 25 W. 43rd St., New York, N. Y.
Arens, Egmont, 480 Lexington Ave., New York, N. Y.
Aridor Co., The, 3428 W. 48th Pl., Chicago, Ill.
Aridve Corp. (A subsidiary of Interchemical Corp.), Fair Lawn, N. J.
Arkell & Smiths, 1941 Mill St., Canajoharie, N. Y.
Arkell Safety Bag Co., 10 E. 40th St., New York, N. Y.
Armstrong Cork Co., 910 Arch St., Lancaster, Pa.
Armstrong Paint & Varnish Works, 1330 S. Kilbourn Ave., Chicago, Ill.
Arpin Products, Inc., 422 Alden St., Orange, N. J.
Arrow Mfg. Co. Inc., 15th & Hudson Sts., Hoboken, N. J.
Arrow Plastics Corp., 178 River Dr., Passaic, N. J.
Artco Papers, Inc., 390 Colt St., Irvington, N. J.
Artisan Plastic Moulding Co., P. O. Box 995, Trenton, N. J.
Arvey Corp., 300 Communipaw Ave., Jersey City, N. J.
Arvey Corp., 3462 N. Kimball Ave., Chicago, Ill.
Arwood Can Co., Knoxville, Tenn.
Ashtabula Corrugated Box Co., The, 3742 Ann Ave., Ashtabula, Ohio
Ashuelot Paper Co., Hinsdale, N. H.
Athol Paper Box Co., 349 Main St., Athol, Mass.
Atlanta Box Factory, Atlanta, Ga.
Atlanta Paper Co., 225 Moore St., Atlanta, Ga.
Atlantic Carton Corp., Norwich, Conn.
Atlantic Excelsior Co., Inc., 11th Ave. & 29th St., New York, N. Y.
Atlantic Paper Box Co., 46 Waltham St., Boston, Mass.
Atlantic Paper Box Corp., The, 139 Franklin St., Jersey City, N. J.
Atlantic Plastic & Metal Parts Co., 2730 Grand Ave., Cleveland, Ohio
Atlantic Plastics, Inc., 33-18-57th St., Woodside, N. Y.
Atlas Appliance Corp., 20 Grand Ave., Bklyn, N. Y.
Atlas-Boxmakers, Inc., 1238 N. Kostner Ave., Chicago, Ill.
Atlas Gum & Sizing Co., 406 Pearl St., New York, N. Y.
Atlas Plastic Mfg. Co., Inc., 47 Broadway, Lynbrook, L. I., N. Y.
Atlas Powder Co., Zapon-Brevolite Div., N. Chicago, Ill.

Atlas Powder Co., Zapon-Keratol Div., Stamford, Conn.
Attleboro Printing & Embossing Co., Inc., 54 Union St., Attleboro, Mass.
Auburn Button Works, Inc., Auburn, N. Y.
Augusta Bag & Burlap Co., 514 Reynolds St., Augusta, Ga.
Auld, Hampton Inc., 104 Verona Ave., Newark, N. J.
Ault & Wiborg Corp., 75 Varick St., New York, N. Y.
Autokraft Box Corp., Maple Ave., Hanover, Pa.
Automatic Paper Box Corp., 1011-25 S. California Ave., Chicago, Ill.
Automatic Plastic Prods., 1368 Park Ave., Emeryville, Calif.
Automatic Scale Co., Inc., 591 Hudson St., New York, N. Y.

B

Babcock, A. H. Co., The, 43 S. Main St., Attleboro, Mass.
Babcock Box Co., Attleboro, Mass.
Bachmann Bros., Inc., 1420 E. Erie Ave., Phila., Pa.
Badger Bros. Bag Co., 1339 Clinton St., Detroit, Mich.
Badger Carton Co., 3238 N. Bremen St., Milwaukee, Wis.
Badger Merchandising Displays, Inc., 3238 N. Bremen St., Milwaukee, Wis.
Baermann, Walter, 208 Race St., Holyoke, Mass.
Bagpak, Inc., 220 E. 42nd St., New York, N. Y.
Bakelite Corp., 30 East 42nd St., New York, N. Y.
Baker, Willoughby, 2921 Chapman St., Oakland, Calif.
Baker Oil Tools, Inc., P. O. Box 127, Vernon Station, Los Angeles, Calif.
Baldwin, Eli & Son, Inc., 356 W. 18th St., New York, N. Y.
Ball Bros. Co., Muncie, Ind.
Bangor Box Co., P. O. Box 4, Bangor, Me.
Bannon Bag Co., 2003 St. Louis St., New Orleans, La.
Barber Colman Co., Molded Prods. Div., Rockford, Ill.
Barger Box Co., Inc., 802 W. Beardsley St., Elkhart, Ind.
Barnes Plastic Co., 439 E. 58th St., Los Angeles, Calif.
Barta-Griffin Co., 72 Commercial St., Worcester, Mass.
Bartlett Label Co., 2135 Portage St., Kalamazoo, Mich.
Bates Mfg. Co., The, 30 Vesey St., New York, N. Y.
Battle Creek Bread Wrapping Machine Co., Battle Creek, Mich.
Bay State Moulding Co., 1189 Dorchester Ave., Boston, Mass.
Bayer, Herbert, 850 Seventh Ave., New York, N. Y.
Beaman Molded Prods. Co., 4637 S. E. Hawthorne Blvd., Portland, Ore.
Beck, Charles Machine Co., 13th & Callowhill Sts., Phila., Pa.
Bedford Can Co., 120 Pearl, Bklyn, N. Y.
Beggs & Graham, 204 Chancellor, Phila., Pa.
Belleville Can Co., Belleville, N. J.
Bellisio, Bartolomeo, 55 W. 42nd St., New York, N. Y.
Bemis Bro. Bag Co., 608 S. Fourth St., St. Louis, Mo.
Bender, H. P., 312 E. 23rd St., New York, N. Y.
Ben Mont Papers, Inc., Mill St., Bennington, Vt.
Bennett, E. W. & Co., 16th & Utah Sts., San Francisco, Calif.
Bensing Bros. & Deney, 401 N. Broad St., Phila., Pa.
Benton Harbor Mfg. Co., 4th & Ridford, Benton Harbor, Mich.
Bergwood Molding Co., 425-27 W. 6th St., Kansas City, Mo.
Berkander, Geo. F. Inc., 891 Broad St., Providence, R. I.
Berkowitz Envelope Co., 19th & Campbell Sts., Kansas City, Mo.
Bernardin Bottle Cap Co., Inc., 329 N. W. 4th St., Evansville, Ind.
Bernhard, Lucian, 1 E. 53rd St., New York, N. Y.
Berni, Alan, 7 E. 44th St., New York, N. Y.
Bertels Metal Ware Co., Inc., 625 Rutter Ave., Kingston, Pa.
Berwin Paper Corp., Dansville, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Betner, Benj. C. Co., Lincoln Highway, Devon, Pa.
Better Packages, Inc., 255 Canal St., Shelton, Conn.
Bicknell & Fuller Paper Box Co., 50 Chardon St., Boston, Mass.
Bielefeld, Herbert Inc., 35 East Wacker Drive, Chicago, Ill.

- Bierdeman Paper Box Co., The, 361 W. Superior St., Chicago, Ill.
- Bingham Bros. Co., 406 Pearl St., New York, N. Y.
- Bird & Son, Inc., East Walpole, Mass.
- Birmingham Paper Co., 521 S. 21st, Birmingham, Ala.
- Bisler, G. A. Inc., 5th & Brown Sts., Phila., Pa.
- Blake, Moffitt & Towne, 599—8th St., San Francisco, Calif.
- Bleier, Milton A., 230 Fifth Ave., New York, N. Y.
- Bloomer Bros. Co., P. O. Box 269, Newark, N. Y.
- Blum, Emery & Co., Inc., 251 Fifth Ave., New York, N. Y.
- Blum Folding Paper Box Co., Inc., The, 79 Bogart St., Bklyn, N. Y.
- Blumenthal, Margaret, 200 Riverside Dr., New York, N. Y.
- Boldt Bag Co., Box 2064, Houston, Texas.
- Bolta Co., The, 151 Canal St., Lawrence, Mass.
- Bond Manufacturing Corp., Inc., 16th & Locust Sts., Wilmington, Del.
- Bones & Mayer, 3915 Powelton Ave., Phila., Pa.
- Boonton Molding Co., Boonton, N. J.
- Bostitch, Inc., 48 Division St., East Greenwich, R. I.
- Bosworth, M. M. Co., Memphis, Tenn.
- Bowser-Morner Testing Laboratories, 141 Bruen St., Dayton, Ohio
- Box Novelties, Inc., 729 Broadway, New York, N. Y.
- Box Shop, Inc., 373 Lexington Ave., New Haven, Conn.
- Braden-Sutphin Ink Co., 3800 Chester Ave., Cleveland, Ohio
- Bradley, A. J. Mfg. Co., 9-11—43rd Ave., Long Island City, N. Y.
- Bradner Smith & Co., 333 S. Desplaines St., Chicago, Ill.
- Brass Goods Mfg. Corp., 345 Eldert St., Bklyn, N. Y.
- Braun, W. Co., 300 N. Canal St., Chicago, Ill.
- Breen, Frederick Murray Inc., 6 E. 45th St., New York, N. Y.
- Breyer Molding Co., 24 N. Racine Ave., Chicago, Ill.
- Brick & Ballerstein, 153 E. 24th St., New York, N. Y.
- Bridgeport Metal Goods Mfg. Co., Bridgeport, Conn.
- Bridgeport Moulded Prods., Inc., 300 Myrtle Ave., Bridgeport, Conn.
- Bridgeport Paper Box Co., 304 Kossuth St., Bridgeport, Conn.
- Bridgeport Testing Laboratory, Inc., 675 Knowlton St., Bridgeport, Conn.
- Brill-Monfort Co., Inc., 77 Washington Ave., Bklyn, N. Y.
- Brockway Glass Co., Inc., 1047 Seventh Ave., Brockway, Pa.
- Brogan, Byard F., 805 Sansom St., Phila., Pa.
- Bronzart Metals Co., 220 Fifth Ave., New York, N. Y.
- Brooklyn Standard Bag Corp., 521 5th Ave., New York, N. Y.
- Brooks & Porter, Inc., 304 Hudson St., New York, N. Y.
- Brooks Bank Note Co., 140 Wilbraham Ave., Springfield, Mass.
- Brooks Paper Co., Security Bldg., St. Louis, Mo.
- Brown & Brown, 56 Congress St., Mobile, Ala.
- Brown Bag Filling Machine Co., The, 10 Main St., Fitchburg, Mass.
- Brown & Bailey Co., 417 N. 8th St., Phila., Pa.
- Brown-Bridge Mills, Inc., The, 1937 Water St., Troy, Ohio
- Brown Co., 404 Commercial, Portland, Me.
- Bryant Electric Co., Bridgeport, Conn.
- Buck Glass Co., The, 841 E. Fort Ave., Baltimore, Md.
- Buckeye Stamping Co., Marion Rd. & Parsons Ave., Columbus, Ohio
- Buckley, C. E. Co., Leominster, Mass.
- Buedingen, Ferdinand Co., Inc., 240 St. Paul St., Rochester, N. Y.
- Buedingen, Wm. & Sons, 1500 Clinton Ave., N., Rochester, N. Y.
- Buffinton, F. H. Co., 363 Eddy St., Providence, R. I.
- Bulkley, Dunton & Co., 295 Madison Ave., New York, N. Y.
- Burn, B. H. Co., 7605 Vincennes Ave., Chicago, Ill.
- Burdick & Son, Inc., 72 Hamilton St., Albany, N. Y.
- Burka Bag Co. of Texas, Commerce Bldg., Galveston, Texas
- Burrows Paper Corp., Little Falls, N. Y.
- Burt, F. N. Co., Inc., 500-540 Seneca St., Buffalo, N. Y.
- Burt Machine Co., 401-3 E. Oliver St., Baltimore, Md.
- Burton Mfg. Co., 3855 N. Lincoln Ave., Chicago, Ill.
- Buser Corp., P. O. Box 2020, Paterson, N. J.
- Bushwick Can Co., Inc., 723 Henry St., Bklyn, N. Y.
- Butterfield, T. F. Inc., 56 Rubber Ave., Naugatuck, Conn.
- Butterfield-Barry Co., Inc., The, 174-178 Hudson St., New York, N. Y.
- Button Corp. of America, 40 Dickerson St., Newark, N. J.
- Cadillac Can Co., Mary St., Mt. Clemens, Mich.
- Caldwell Products, Inc., 142 W. 24th St., New York, N. Y.
- California In. Co., Inc., 545 Sansome St., San Francisco, Calif.
- California Pacific Plastic Co., 2225 Sunset Blvd., Los Angeles, Calif.
- California Plastic Moulding Co., 1702 E. 61st St., Los Angeles, Calif.
- California Plastics Co., 580 Market St., San Francisco, Calif.
- California Testing Laboratories, Inc., 1429 Santa Fe Ave., Los Angeles, Calif.
- Calumet Carton Co., Harvey, Ill.
- Calvert Lithographing Co., 2100 Grand River Ave., Detroit, Mich.
- Cambridge Instrument Co., Inc., 3732 Grand Central Terminal, New York, N. Y.
- Cambridge Paper Box Co., 196 Broadway, Cambridge, Mass.
- Cameo Die & Label Co., 154 W. 14th St., New York, N. Y.
- Cameron Machine Co., 61 Poplar St., Bklyn, N. Y.
- Camford Machine Corp., 57 W. 19th St., New York, N. Y.
- Campbell Box & Tag Co., 903 S. Main St., South Bend, Ind.
- Canister Co., The, Phillipsburg, N. J.
- Cans, Inc., 3217 W. 47th Place, Chicago, Ill.
- Capac Mfg. Co., Capac, Mich.
- Capitol Paper Box Co., Inc., 1300—6th St., North Bergen, N. J.
- Capitol Printing Ink Co., Inc., 406 Channing St., N. E., Washington, D. C.
- Carbide & Carbon Chem. Corp., 30 E. 42nd St., New York, N. Y.
- Cardinal Corp., The, Evansville, Ind.
- Carlson Autopress Corp., Rockledge, Pa.
- Carlson, John P. Inc., 420 Carroll St., Bklyn, N. Y.
- Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Carolina Paper Board Corp., Ft. of Gardner Ave., Charlotte, N. C.
- Carpenter Container Corp., 137-147—41st St., Bklyn, N. Y.
- Carr-Lowrey Glass Co., Baltimore, Md.
- Carter, Joseph, 6 N. Michigan Ave., Chicago, Ill.
- Carter, William Co., Highland Ave., Needham Heights, Mass.
- Carthage Paper Makers, Inc., Carthage, N. Y.
- Cartoning Machinery Co. (See U. S. Automatic Box Machinery Co., Inc.)
- Carvin Bottle Cap Corp., 1155 Manhattan Ave., Bklyn, N. Y.
- Casco Paper Box Co., Inc., 68 Cross St., Portland, Me.
- Casselman, T. & E. Inc., 356-362 W. 18th St., New York, N. Y.
- Catalin Corp., 1 Park Ave., New York, N. Y.
- Cavalier Cap Corp., 507 Botetourt St., Norfolk, Va.
- Celanese Celluloid Corp., 180 Madison Ave., New York, N. Y.
- Cellulose Packaging Corp., 235 E. 42nd St., New York, N. Y.
- Cellulose Wadding Products, Inc., Garwood, N. J.
- Cellulastic Corp., 50 Ave. L, Newark, N. J.
- Cellusuede Products, Inc., Rockford, Ill.
- Celon Co., The, 2034 Penn. Ave., Madison, Wis.
- Central Bag & Burlap Co., 4513 S. Western Blvd., Chicago, Ill.
- Central Can Co., Inc., 2417 W. 19th St., Chicago, Ill.
- Central Can Co., Inc., 1106 Santa Fe, Kansas City, Mo.
- Central Carton Co., 1901 Gest St., Cincinnati, Ohio
- Central Die Casting & Mfg. Co., 2935 W. 47th St., Chicago, Ill.
- Central Fibre Products Co., 111 W. Washington St., Chicago, Ill.
- Central Lithograph Co., The, 113 St. Clair Ave., N. E., Cleveland, Ohio
- Central Machine Works Co., 1234 Central Ave., N. E., Minneapolis, Minn.
- Central Paper Corp., Muskegon, Mich.
- Central Paper Co., Manitowoc St., Menasha, Wis.
- Central Paper Box Co., 2911 Bellevue Ave., Kansas City, Mo.
- Central Process Corp., 1401 S. Circle Ave., Forest Park, Ill.
- Central States Paper & Bag Co., 2600 N. Broadway, St. Louis, Mo.
- Central Waxed Paper Co., 5659 W. Taylor St., Chicago, Ill.
- Century Ribbon Mills, 80 Madison Ave., New York, N. Y.
- Chain Belt Co., 1600 W. Bruce St., Milwaukee, Wis.
- Champion Paper & Fibre Co., The, Hamilton, Ohio
- Champlain Div. of Interchemical Corp., 636—11th Ave., New York, N. Y.
- Chase, H. & L., 267 Atlantic Ave., Boston, Mass.
- Chase Bag Co., 155 E. 44th St., New York, N. Y.
- Chasen, Alex & Co., Columbia Ave. & Randolph Sts., Phila., Pa.
- Chaspef Mfg. Co., 16 W. 61st St., New York, N. Y.
- Chaifield Paper Co., 227 W. 3rd St., Cincinnati, Ohio
- Chemical Color & Supply Co., Div. General Printing Ink Corp., 547 E. Clark St., Chicago, Ill.
- Chemical Paper Mfg. Co., Jackson St., Holyoke, Mass.
- Chemical Plastics, Inc., 7301 W. Lake St., St. Louis Park, Minneapolis, Minn.
- Cheron, Pierre J., 65 Locust St., Stratford, Conn.
- Chesapeake Can Co., Inc., Crisfield, Md.
- Chesapeake Paperboard Co., The, Baltimore, Md.
- Chicago Carton Co., 4200 S. Crawford Ave., Chicago, Ill.
- Chicago Die Mold Mfg. Co., 1735 Diversey Pkwy., Chicago, Ill.
- Chicago Gum Tape Co., 855 W. Adams St., Chicago, Ill.
- Chicago Label & Box Co., 312 N. May St., Chicago, Ill.
- Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago, Ill.
- Chicago Plastic Mfg. Co., 4029 W. Kinzie St., Chicago, Ill.
- Chicago Printed String Co., 2319 Logan Blvd., Chicago, Ill.
- Chipman, Richmond Lane, Jr., 1 Brunswick Rd., Montclair, N. J.
- Chirpe, W. Rodney, 185 N. Wabash Ave., Chicago, Ill.
- Cinch Mfg. Corp., 2335 W. Van Buren St., Chicago, Ill.
- Cincinnati Advertising Products Co., 3274 Beekman St., Cincinnati, Ohio
- Cincinnati Industries, Inc., Lockland (Cincinnati), Ohio
- Cincinnati Molding Co., 2037 Florence Ave., Cincinnati, Ohio
- Cin-Made Corp., The, 801 E. 3rd St., Cincinnati, Ohio
- Claff, M. B. & Sons, Inc., 31 West St., Randolph, Mass.
- Claremould Plastics Co., 135-37-39 Jackson St., Newark, N. J.
- Clark, Geo. V. Co., Inc., 42-26—13th St., Long Island City, N. Y.
- Clark, J. L. Mfg. Co., Rockford, Ill.
- Clark Box Co., The, 436 Main St., Danbury, Conn.
- Clark Stek-O Corp., 1631 Dewey Ave., Rochester, N. Y.
- Clarke Can Co., 12th & Fitzwater Sts., Phila., Pa.
- Clarke, Rene, 247 Park Ave., New York, N. Y.
- Cleveland Cartons, Div. of Robert Gair Co., Inc., 10610 Berea Rd., Cleveland, Ohio
- Cleveland Container Co., The, 10630 Berea Rd., Cleveland, Ohio
- Cleveland Crimping Press Co., 5511 Euclid Ave., Cleveland, Ohio
- Cleveland Plastics, Inc., 1611 E. 21st St., Cleveland, Ohio
- Clifton Paper Board Co., Clifton, N. J.
- Climax Mfg. & Molding Corp., 315 Reynolds Pl., S. W., Canton, Ohio
- Clover Leaf Paint & Varnish Corp., 43-43 Vernon Blvd., Long Island City, N. Y.
- Clover Paper & Transparent Boxes, Inc., 816-826 E. 140th St., New York, N. Y.
- Collura, Francesco, 1 E. 53rd St., New York, N. Y.
- Coloroid Co., Inc., 6919 Lorain Ave., Cleveland, Ohio
- Colton, Arthur Co., 2602 Jefferson Ave., E., Detroit, Mich.
- Colt's Patent Fire Arms Mfg. Co., 17 Van Dyke Ave., Hartford, Conn.
- Columbia Box Board Mills, Inc., Chatham, N. Y.
- Columbia Protektosite Co., Inc., 631 Central Ave., Carlstadt, N. J.
- Columbia Specialty Co., Inc., 6301 Eastern Ave., Baltimore, Md.
- Columbus Coated Fabrics Corp., 1280 N. Grant Ave., Columbus, Ohio
- Columbus Laboratories, The, 31 N. State St., Chicago, Ill.
- Columbus Paper Box Co., Inc., 344 W. Town St., Columbus, Ohio
- Columbus Plastic Products Co., Inc., 519 Dublin Ave., Columbus, Ohio
- Colwell, Laurence J., 305 E. 63rd St., New York, N. Y.
- Comet Envelope & Paper Co., Inc., 5 E. 17th St., New York, N. Y.
- Commercial Paste Co., The, 504 Buttles Ave., Columbus, Ohio
- Commonwealth Plastic Co., 140 Adams St., Leominster, Mass.
- Compo-Site, Inc., 85 Fifth Ave., Paterson, N. J.
- Consolidated Paper Box Corp., 128 Thompson St., Bridgeport, Conn.
- Condon, Frank, 25 Broadway, New York, N. Y.
- Conneaut Can Co., Inc., Conneaut, Ohio
- Connecticut Hard Rubber Co., 407 East St., New Haven, Conn.
- Connecticut Plastic Products Co., 124 N. Elm St., Waterbury, Conn.
- Consolidated Box Co., Inc., 3302 N. Armenia Ave., P. O. Box, 4341, Tampa, Fla.
- Consolidated Fruit Jar Co., New Brunswick, N. J.
- Consolidated Lithographing Corp., 1013 Grand St., Bklyn, N. Y.
- Consolidated Molded Plastics Corp., Scranton, Pa.
- Consolidated Packaging Machinery Corp., 1400 West Ave., Buffalo, N. Y.
- Consolidated Paper Co., E. First St., Monroe, Mich.
- Consolidated Paper & Box Mfg. Co., 413 E. Canal St., Richmond, Va.
- Consolidated Paper Bag Co., Somerville, Mass.
- Consolidated Paper Box Co., 6 Vernon St., Somerville, Mass.
- Consolidated Water and Power Co., Wisconsin Rapids, Wis.
- Container Co., The, 975 Glenn St., Van Wert, Ohio
- Container Corp. of America, 111 W. Washington St., Chicago, Ill.
- Container Equipment Corp., 204-8 Riverside Ave., Newark, N. J.
- Container Testing Laboratories, Inc., 45 E. 22nd St., New York, N. Y.
- Continental Bag Specialties Corp., 601 W. 26th St., New York, N. Y.
- Continental Can Co., 100 E. 42nd St., New York, N. Y.
- Continental Container Corp. (See Scandore Paper Box Co.)
- Continental Folding Paper Box Co., Inc., Ridgefield, N. J.
- Continental Lithograph Corp., 952 East 72nd St., Cleveland, Ohio
- Continental Paper Co., Ridgefield Park, N. J.
- Continental Paper Products Co., 1000 W. Louisiana Ave., Denver, Colo.
- Continental Plastics Corp., 314 W. Erie St., Chicago, Ill.

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Cooper, R. G., 7376 Grand River Ave., Detroit, Mich.
 Cordiano Can Co., Inc., 20 Grand Ave., Bklyn, N. Y.
 Corn Products Refining Co., 17 Battery Pl., New York, N. Y.
 Cornell Wood Products Co., 230 N. Michigan Ave., Chicago, Ill.
 Corning Glass Works, Corning, N. Y.
 Cottonluxe Mfg. Co., 597 E. 137th St., New York, N. Y.
 Cottrell, C. B. & Sons Co., Claybourn Div., 3713 N. Humboldt Ave., Milwaukee, Wis.
 Coughlin Mfg. Co., 699 E. 132nd St., New York, N. Y.
 Courmand, E. L. Inc., 285 Madison Ave., New York, N. Y.
 Coy Paper Co., Claremont, N. H.
 Craftsman Label Co., 120 W. 20th St., New York, N. Y.
 Craven-Whittaker Co., 215 Georgia Ave., Providence, R. I.
 Crawford, John W. Co., 100 Varick St., New York, N. Y.
 Crescent Box Corp., 621 E. Erie St., Phila., Pa.
 Crescent Burlap Bag Co., 4124 Toulouse St., New Orleans, La.
 Crescent Ink & Color Co. of Pa., 464 N. 5th St., Phila., Pa.
 Crossdale & De Angelis, Eagle & Lawrence Rds., Upper Darby, Pa.
 Croce, Isabel M., 137 E. 38th St., New York, N. Y.
 Crocker Union, 735 Harrison St., San Francisco, Calif.
 Crompton-Adelphia, John Corp., 145 W. Columbia Ave., Phila., Pa.
 Cromwell Paper Co., The, 48929 S. Whipple St., Chicago, Ill.
 Crook Paper Box Co., 110-120 E. 10th Ave., N. Kansas City, Mo.
 Cross Paper Products Corp., 2595 Third Ave., New York, N. Y.
 Crowell Corp., The, Yorklyn, Dela.
 Crown Can Co., Erie Ave. & "H" St., Phila., Pa.
 Crown Can & Seal Co., Baltimore, Md.
 Crown-Willamette Paper Co., 343 Sansome St., San Francisco, Calif.
 Crown Zellerbach Corp., 343 Sansome St., San Francisco, Calif.
 Crunden, Martin Mfg. Co., 2nd & Gratiot, St. Louis, Mo.
 Cruver Mfg. Co., 2456-60 Jackson Blvd., Chicago, Ill.
 Cruze, Charles, 2008 W. 7th St., Los Angeles, Calif.
 Crystal Bag Co., Chickamauga, Ga.
 Crystal Tissue Co., The, Middletown, Ohio
 Crystal Transparent Mfg. Co., Inc., 136 W. 21st St., New York, N. Y.
 Crystal Tube Mfg. Co., 538 S. Wells St., Chicago, Ill.
 Cupples Co., 7th & Spruce Sts., St. Louis, Mo.
 Cupples-Hesse Corp., 4175 N. Kingshighway Memorial Blvd., St. Louis, Mo.
 Cutler & Saleeby, Inc., 60 Tyler St., Springfield, Mass.
 Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee, Wis.

D

D & W Tool Co., 601 E. Broadway, Glendale, Calif.
 D'Addario, Thomas, 11 W. 42nd St., New York, N. Y.
 Danbury Square Box Co., The, P. O. Box 729, Danbury, Conn.
 Daniels Mfg. Co., Rhinelander, Wis.
 Datz Mfg. Co., 537 N. 3rd St., Phila., Pa.
 Davies Can Co., The, 872 E. 72nd St., Cleveland, Ohio
 Davies, Harry Molding Co., 1428 N. Wells St., Chicago, Ill.
 Davison, George M., 50 E. 42nd St., New York, N. Y.
 Davison Chemical Corp., The, Silica Gel Dept., 20 Hopkins Pl., Baltimore, Md.
 Dayton Insulating Molding Co., 207 E. 6th St., Dayton, Ohio
 Decotone Products, 193 Kimball St., Fitchburg, Mass.
 Deerfield Glassine Co., Monroe Bridge, Mass.
 Deisroth, W. H. Co., Inc., S. E. Cor. 3rd & Cambria Sts., Phila., Pa.
 Dejonge, Louis & Co., 161 Sixth Ave., New York, N. Y.
 Delmar Paper Box Co., The, 419 W. 5th St., Cincinnati, Ohio
 Delta Paper Boxes, Inc., 34 Hubert St., New York, N. Y.
 DeNina, James Andrew, 509 Fifth Ave., New York, N. Y.
 Dennison Mfg. Co., Howard St., Framingham, Mass.
 Densen-Banner Co., Ridgefield Park, N. J.
 Design Center, Inc., 531 W. 52nd St., New York, N. Y.
 Designers for Industry, Inc., 2915 Detroit Ave., Cleveland, Ohio
 Designs, Inc., 2027-83rd St., North Bergen, N. J.
 Detecto Scales, Inc., 1 Main St., Bklyn, N. Y.
 Detroit Macoid Corp., 12345 Cloverdale Ave., Detroit, Mich.
 Detroit Sulphite & Paper Co., 9125 W. Jefferson Ave., Detroit, Mich.
 Detroit Testing Laboratory, The, 554 Bagley Ave., Detroit, Mich.
 Dewey & Almy Chemical Co., 62 Whittemore Ave., Cambridge B, Mass.

Dexter, C. H. & Sons, Inc., 100 Canal, Windsor Locks, Conn.
 Dexter Folder Co., Pearl River, N. Y.
 Diagraph-Bradley Stencil Machine Corp., 3745 Forest Park Blvd., St. Louis, Mo.
 Diamond Paper Box Co., Somerton St. at 741 Park Ave., Rochester, N. Y.
 Diamond Paper Mills Co., Inc., 205 E. 42nd St., New York, N. Y.
 Dickerman Box Co., 36 Landsdowne St., Cambridge, Mass.
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 Dillon-Beck Mfg. Co., 103 Montgomery Ave., Irvington, N. J.
 Diabrow Mfg. Co., 16-34 Nesbit St., Newark, N. J.
 Dispersions Process, Inc., 1230-6th Ave., New York, N. Y.
 Display Finishing Co., Inc., 21-16-44th Rd., Long Island City, N. Y.
 Displayers, The, 167 W. 64th St., New York, N. Y.
 District of Columbia Paper Mills, Inc., Potomac & K Sts., N. W., Washington, D. C.
 Ditch, Ruth M., 813 Mart Bldg., St. Louis, Mo.
 Dix, J. J. Inc., 829 E. 134th St., New York, N. Y.
 Dixie-Vortex Co., 24th St. & Dixie Ave., Easton, Pa.
 Dixie Wax Paper Co., Inc., 1300 S. Polk St., P. O. Box 5116, Dallas, Texas.
 Dobeckmun Co., The, 3301 Monroe Ave., Cleveland, Ohio
 Dodge Cork Co., Inc., Lancaster, Pa.
 Dodge, E. F. Paper Box Co., 124 Central St., Leominster, Mass.
 Dorfman, A. Co., Inc., 59 W. 19th St., New York, N. Y.
 Double Duty Products, Inc., 6919 Lorain Ave., Cleveland, Ohio
 Dow Chemical Co., The, Midland, Mich.
 Dowd, M. S. Carton Co., 162 Barbour St., Hartford, Conn.
 Drell Novelty Mfg. Co., 519 Eighth Ave., New York, N. Y.
 Driscoll, Martin & Co., 610 Federal St., Chicago, Ill.
 Dumas Laboratory, The, 407 Five Ivy St. Bldg., Atlanta, Ga.
 Dunn, Thomas W. Co., 546 Greenwich St., New York, N. Y.
 Dunn Sulphite Paper Co., Port Huron, Mich.
 Dunne, Liam, 413 E. 52nd St., New York, N. Y.
 du Pont de Nemours, E. I. & Co., Inc., 10th & Market Sts., Wilmington, Del.
 Durez Plastics & Chemicals, Inc., 1943 Walck Rd., N. Tonawanda, N. Y.
 Durite Plastics, Inc., 5000 Summerdale Ave., Phila., Pa.
 Du-Tone Ribbon Corp., 511 E. 72nd St., New York, N. Y.

E

Eagle Can Co., 356 Mystic Ave., Somerville, Mass.
 Eagle Paper Box Co., 1826-6th St., Detroit, Mich.
 Eagle Paper Box Co., 720 E. 11th St., New York, N. Y.
 Eagle Paper Box Mfg. Co., 1755 N. Monitor Ave., Chicago, Ill.
 Eagle Plastics Corp., 23-10 Bridge Plaza So., Long Island City, N. Y.
 Eagle Printing Ink Co., Div. General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.
 Earl, M. J. Co., Inc., Reading, Pa.
 Earlville Paper Box Co., Earlville, N. Y.
 Eastern Can Co., Inc., 649 Kent Ave., Bklyn, N. Y.
 Eastern Cap & Closure Corp., Baltimore, Md.
 Eastern Plastics Prods. Corp., 1007 McCarty St., Pittsburgh, Pa.
 Eastern States Cartons, Div. of Robert Gair Co., Inc., 75 Front St., Bklyn, N. Y.
 Eastman Kodak Co., Rochester, N. Y.
 Eby, Hugh H. Inc., 4700 Stenton Ave., Phila., Pa.
 Eclipse Moulded Products Co., 5151 N. 32nd St., Milwaukee, Wis.
 Economic Machinery Co., 18 Grafton St., Worcester, Mass.
 Economy Box & Pie Plate Co., Marion, Ind.
 Economy Fuse & Mfg. Co., 2717 N. Greenview Ave., Chicago, Ill.
 Economy Novelty & Printing Co., 225 W. 39th St., New York, N. Y.
 Eddy Paper Corp., The, 919 N. Michigan Ave., Chicago, Ill.
 Eddy, Three Rivers, Mich., Manitowoc, Wis., Milwaukee, Wis., Cedar Rapids, Iowa, Detroit, Mich.
 Eden Paper Co., Lancaster, Pa.
 Edwards & Deutsch Lithographing Co., 2320-40 S. Wabash Ave., Chicago, Ill.
 Eggers O'Flying Co., 1423 Leavenworth, Omaha, Neb.
 Egyptian Lacquer Mfg. Co., The, 1270 Sixth Ave., New York, N. Y.
 Ehlbert Products, 844 W. Adams St., Chicago, Ill.
 Einson-Freeman Co., Inc., Staff & Borden Aves., Long Island City, N. Y.
 Electric Auto-Lite Co., Bay Mfg. Div., Morton St., Bay City, Mich.
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 Ellis, George D. & Sons, Inc., 309 N. 3rd St., Phila., Pa.
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 Empire Box Corp., 70 Outwater Lane, Garfield, N. J.
 Empire Box Corp., 919 N. Michigan Ave., Chicago, Ill.
 Empire Can Corp., 28 Locust, Bklyn, N. Y.
 Empire Lithographing Co., Inc., 333 Hudson St., New York, N. Y.

Empire Metal Cap Co., Inc., 32-33rd St., Bklyn, N. Y.
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 Eppy, Samuel Inc., 254 W. 31st St., New York, N. Y.
 Equitable Paper Bag Co., Inc., 47-00 31st Pl., Long Island City, N. Y.
 Erie Corrugated Box Co., The, Erie, Pa.
 Erie Plastics Co., 1304 Cranberry St., P. O. Box 515, Erie, Pa.
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 Eureka Mfg. Co., Inc., 144 W. Britannia St., Taunton, Mass.
 Eureka Paper Box Co., Howard Ave. & E. Canal St., Williamsport, Pa.
 Eureka Paper Box Corp., 4949 N. Pulaski Rd., Chicago, Ill.
 Eureka Specialty Printing Co., 530 Electric St., Scranton, Pa.
 Ever Ready Label Corp., 143-47 E. 25th St., New York, N. Y.
 Everett Transparent Container Co., 251 Third Ave., New York, N. Y.
 Exact Weight Scale Co., The, 223 W. Fifth Ave., Columbus, Ohio
 Ex-Cell-O Corp., Pure-Pak Div., 1200 Oakmond Blvd., Detroit, Mich.
 Exceler Paper Specialties Co., Inc., 640 W. 57th St., New York, N. Y.

F

Fabart Instrument Co., 4740 N. Clark St., Chicago, Ill.
 Fairchild, E. E. Corp., 367 Orchard St., Rochester, N. Y.
 Fales Chemical Co., Inc., The, Cornwall Landing, N. Y.
 Farrell, Harry H., 6 N. Michigan Ave., Chicago, Ill.
 Farrington Mfg. Co., Green & Amory Sts., Boston, Mass.
 Federal Carton Corp., 638 W. 57th St., New York, N. Y.
 Federal Container Co., 56th St. & Paschall Ave., Phila., Pa.
 Federal Paper Board Co., Inc., 24 River Rd., Bogota, N. J.
 Federal Tin Co., Inc., 11 E. Barre St., Baltimore, Md.
 Federal Tool Corp., 400 N. Leavitt St., Chicago, Ill.
 Federico, Joseph B., 1116 Roselle Ave., Niagara Falls, N. Y.
 Fein's Tin Can Co., Inc., 50th St. & First Ave., Bklyn, N. Y.
 Ferguson, J. L. Co., Rt. 52 at Republic Ave., Joliet, Ill.
 Ferguson-Lander Mfg. Co., 1733 W. Hubbard St., Chicago, Ill.
 Fernstrom Paper Mills, Inc., Pomona, Calif.
 Fibreboard Products, Inc., 710 Russ Bldg., San Francisco, Calif.
 Fibre Cord Co., 755 E. 134th St., New York, N. Y.
 Fillmore & Slade, No. Bennington, Vt.
 Findley, F. G. Co., The, 1001 W. McKinley Ave., Milwaukee, Wis.
 Firestone Rubber & Latex Products Co., 1 Firestone Ave., Fall River, Mass.
 Fitchburg Paper Co., 642 River St., Fitchburg, Mass.
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 Fleisig, H. Inc., 402 Lafayette St., New York, N. Y.
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 Fleming & Sons, Inc., 1116 E. 12th St., Dallas, Tex.
 Flint, Howard Ink Co., 3545 Scotten Ave., Detroit, Mich.
 Floramics Co., The, Tampa, Fla.
 Flour City Paper Box Co., 510 Plymouth Ave., Minneapolis, Minn.
 Flower City Specialty Co., 158 Hollenbeck St., Rochester, N. Y.
 Flower City Tissue Mills Co., 700 Driving Park Ave., Rochester, N. Y.
 Folding Boxes, Inc., P. O. 247, Manchester, Conn.
 Food Dispenser Co., The, 117 Spruce St., Hartford, Conn.
 Food Machinery Corp., Sprague-Sells Div., Hoopes-ton, Ill.
 Food Packaging, Div. of Milprint, Inc., 431 W. Florida, Milwaukee, Wis.
 Forbes Lithograph Co., The, P. O. Box 513, Boston, Mass.
 Force, Wm. A. & Co., Inc., 216 Nichols Ave., Bklyn, N. Y.
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Foster-Grant Co., Inc., 289 N. Main St., Leominster, Mass.
 Fox, C. J. Co., 236 Aborn St., Providence, R. I.
Foxon Co., The, 234 W. Park St., Providence, R. I.
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 Franklin Board & Paper Co., The, Franklin, Ohio
 Franklin Folding Paper Box Co., 223 W. Huron St., Chicago, Ill.
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 Freeman, Edna Leslie, 37 Madison Ave., Rm. 1106, New York, N. Y.
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 Friedman Bag Co., 600 Aliso St., Los Angeles, Calif.
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 Frohn, John C., 10 Thatcher St., Boston, Mass.
 Frost Box Co., Inc., Pawtucket, R. I.
 Frost White Paper Mills, Inc., 303 5th Ave., New York, N. Y.
 Fuchs & Lfg. Mfg. Co., Div. General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.
 Fulton Bag & Cotton Mills, P. O. Box 1726, Atlanta, Ga.
 Futuristic Paper Box Co., Inc., 346 Carroll St., Bklyn, N. Y.

G

Gaetjens, Berger & Wirth, 35 York St., Bklyn, N. Y.
Gair, Robert Co., Inc., 155 E. 44th St., New York, N. Y.
 Gallie-King Bag Co., P. O. Box 1191, Houston, Tex.
 Gamse Lithographing Co., Inc., 419-421 E. Lombard St., Baltimore, Md.
Gardner-Richardson Co., The, 407 Charles St., Middletown, Ohio
 Gardner Taubes Corp., 20 W. 22nd St., New York, N. Y.
 Garfield Box Co., 2 Ackerman Ave., Clifton, N. J.
 Garfield Mfg. Co., 10 Midland Ave., Garfield, N. J.
 Garvey Fountain Brush & Ink Co., Newstead & Clayton Aves., St. Louis, Mo.
 Gates Paper Co., Ltd., The, 964 McGarry St., Los Angeles, Calif.
 Gaylord Container Corp., 111 N. 4th St., St. Louis, Mo.
 Gebhart Folding Box Co., 22 Powers St., Dayton, Ohio
 Gellman Mfg. Co., 1700—1st St., Rock Island, Ill.
 Gemloid Corp., 79-10 Albion Ave., Elmhurst, L. I., N. Y.
 General Bag Corp., 2715 E. 34th St., Cleveland, Ohio
 General Can Co., 1603 S. Canal St., Chicago, Ill.
 General Cellulose Co., Inc., The, 1939 South Ave., Garwood, N. J.
 General Electric Co., Plastics Dept., 1 Plastics Ave., Pittsfield, Mass., West Lynn, Mass., Taunton, Mass., Meriden, Conn., Ft. Wayne, Ind.
 General Industrial Finishes Div., General Printing Ink Corp., 100—6th Ave., New York, N. Y.
 General Industries Co., Elyria, Ohio
 General Insulate Co., Inc., 11 New York Ave., Bklyn, N. Y.
 General Laminating, Inc., 34 W. 27th St., New York, N. Y.
 General Molded Products, Inc., 1300 Oakwood Ave., Des Plaines, Ill.
 General Molding Co., Robbins & Rockledge Aves., Rockledge, Pa.
 General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.
 General Products Corp., 107 Salem St., Union Springs, N. Y.
 General Ribbon Mills, Catsauqua, Pa.
 George & Sherrard Paper Co., 220 E. 42nd St., New York, N. Y.
 Gerbreux, Duff & Kinder, 80 Richards St., Bklyn, N. Y.
 Gereke-Allen Carton Co., 5101 Penrose St., St. Louis, Mo.
 Gerrard Co., Inc., The, 2915 W. 47th St., Chicago, Ill.
 Gerth, Ruth, 228 E. 61st St., New York, N. Y.
 Gesell, R. Inc., 200 W. Houston St., New York, N. Y.
 Gesler Jewelry Co., 106 Gesler St., Providence, R. I.
 Gianninoto, Frank & Associates, 250 Park Ave., New York, N. Y.
 Gibbs Mfg., 2411 Sixth St., Berkeley, Calif.
 Gits Molding Corp., 4600 W. Huron St., Chicago, Ill.
 Glass Containers, Inc., 3601 Santa Fe Ave., Los Angeles, Calif.
 Glass Industries, Inc., 10 W. 33rd St., New York, N. Y.
 Clickman, L. & Co., 505 Johnson Ave., Bklyn, N. Y.
 Globe Mfg. Co., 2009 Kinsey St., Phila., Pa.
 Globe Paper Box Co., 233 W. Huron St., Chicago, Ill.
 Globe Paper Box Mfg. Co., 1227 University Ave., St. Paul, Minn.
 Globe Tool & Molded Prods. Co., 1032 Mulberry St., Rockford, Ill.
 Glyco Products Co., Inc., 230 King St., Bklyn, N. Y.
 Goat, Fred Co., Inc., The, 314 Dean St., Bklyn, N. Y.
 Golden Gate Mfg. Co., 1250 Powell, Oakland, Calif.
 Goldsborough, Francis F., 353 Fifth Ave., New York, N. Y.
 Goodrich, B. F. Co., The, 500 S. Main St., Akron, Ohio

Goodyear Tire & Rubber Co., The, Pliofilm Div., 1144 E. Market St., Akron, Ohio
 Gordon-Lacey Chemical Products Co., 52-02—48th St., Maspeth, L. I., N. Y.
 Gorham Co., The, Elmwood P. O., Providence, R. I.
 Goss Printing Press Co., 1535 S. Paulina Ave., Chicago, Ill.
 Grace, Tom W. Co., 1504 Munger Ave., Dallas, Texas
 Gotham Tissue Corp., 1000 E. 149th St., New York, N. Y.
 Grady & Neary Co., 117 W. Harrison St., Chicago, Ill.
 Grafflin Bag Co., 1407 Philpot St., Baltimore, Md.
 Graham Mfg. Co., Holyoke, Mass.
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 Grand Rapids Label Co., Graphic Arts Bldg., 545 Ottawa St., N. W., Grand Rapids, Mich.
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Nalco, Inc., 203 E. 18th St., New York, N. Y.
 Na-Mac Products Corp., 1027 N. Seward St., Hollywood, Calif.
 Narragansett Coated Paper Corp., 740 York Ave., Pawtucket, R. I.
 Nash, Ben Inc., 51 Fifth Ave., New York, N. Y.
 Nashua Gummed & Coated Paper Co., 44 Franklin St., Nashua, N. H.
 Nashua Package Sealing Co., Inc. (See Nashua Gummed & Coated Paper Co.)
 Natick Box & Board Co., Natick, Mass.
 National Adhesives Div. of National Starch Products, Inc., 820 Greenwich St., New York, N. Y.
 National Bag Corp., 271 Madison Ave., New York, N. Y.
 National Bread Wrapping Machine Co., 132 Birnie Ave., Springfield, Mass.
 National Can Corp., 110 E. 42nd St., New York, N. Y.
 National Canners' Laboratory, 711 Pennsylvania Ave., Pittsburgh, Pa.
 National Collapsible Tube Co., 362 Carpenter St., Providence, R. I.
 National Color Printing Co., Inc., The, 930 E. Monument St., Baltimore, Md.
 National Container Corp., 30-01 Review Ave., Long Island City, N. Y.
 National Folding Box Co., James & Alton Sts., New Haven, Conn.
 National Lock Co., 1902 Seventh St., Rockford, Ill.
 National Metal Edge Box Co., 340 N. 12th St., Phila., Pa.
 National Organ Supply Co., 17th & Cascade Sts., Erie, Pa.
 National Packaging Machinery Co. (See U. S. Automatic Box Machinery Co., Inc.)
 National Paper Box Co., 20th St. & Tracy Ave., Kansas City, Mo.
 National Paper Box Mfg. Co., 1346 N. Branch St., Chicago, Ill.
 National Paper Co., 334 Simpson St., N. E., Atlanta, Ga.
 National Plastics, Inc., 2330 McCalla Ave., Knoxville, Tenn.
 National Printing & Engraving Co., 7 S. Dearborn St., Chicago, Ill.
 National Process Co., 75 Varick St., New York, N. Y.
 National Seal Corp., 14th Ave. & 37th St., Bklyn, N. Y.
 National Starch Products, Inc., National Adhesives Div., 820 Greenwich St., New York, N. Y.
 National Tin Can Mfg. Co., 134 W. Third St., New York, N. Y.
 National Transparent Box Co., 48 Hampden St., Springfield, Mass.
 National Waterproofing Co., Camden, N. J.
 Naugatuck Chemical Div. of U. S. Rubber Co., 1230 Sixth Ave., New York, N. Y.
 Nash, M. J. & Co., 1600 S. Dearborn St., Chicago, Ill.
 Nelson, B. F. Mfg. Co., 401 Main St., N. E. Minneapolis, Minn.
 Neostyle, Inc., 410 N. Wabash Ave., Chicago, Ill.
 Neumann, Robert Co., The, 1910-12 W. Eighth St., Cincinnati, Ohio
 Nevins-Church Press, The, 250 Park Ave., New York, N. Y.
 Newark Boxboard Co., Newark, N. J.
 Newark Glassine Bag Co., 50 Jelliff Ave., Newark, N. J.
 Newark Paper Box Co., 216 High St., Newark, N. J.
 New Can Co., Inc., The, 200 Commercial St., Malden, Mass.
 New England Box Co., 173 Main St., Greenfield, Mass.
 New England Card & Paper Co., Inc., 10-30 Hanover St., Springfield, Mass.
 New England Collapsible Tube Co., 3132 So. Canal St., Chicago, Ill.
 New England Novelty Co., 98 Adams St., Leominster, Mass.
 New Haven Pulp & Board Co., 295 East St., New Haven, Conn.
 New Jersey Machine Corp., 1616 Willow Ave., Hoboken, N. J.
 New Products Corp., North Shore, Benton Harbor, Mich.
 Newton Carton, 27 Haynes Ave., Newark, N. J.
 New York Laminating Co., 60 Woolsey St., Irvington, N. J.
 New York Testing Laboratories, 80 Washington St., New York, N. Y.
 Niagara Insul-Bake Specialty Co., Inc., 483-493 Delaware Ave., Albany, N. Y.
 Niagara Lithograph Co., 1050 Niagara St., Buffalo, N. Y.
 Nickelson, John, 155-17 Sanford Ave., Flushing, N. Y.
 Nicoll & Co., 450 Fifth St., San Francisco, Calif.
 Niemand Bros., Inc., 37-11-35th Ave., Long Island City, N. Y.
 Nixon Nitration Works, Nixon, N. J.
 Noble & Westbrook Mfg. Co., 19 Westbrook St., East Hartford, Conn.
 Noon Bag Co., 34 N. W. 1st Ave., Portland, Ore.
 North End Paper Co., Fulton, N. Y.
 North American Pulp & Paper Co., 220 E. 42nd St., New York, N. Y.
 North State Paper Box Co., Statesville, N. C.
 Northeastern Molding, Inc., Dunsell Lane, Pawtucket, R. I.
 Northeastern Plastics Corp., 584 Commonwealth Ave., Boston, Mass.

Northern Industrial Chemical Co., 7 Elkins St., So. Boston, Mass.
 Northern Paper Mills, Green Bay, Wis.
 Northern Plastics, Inc., 2233 University Ave., St. Paul, Minn.
 Northwest Testing Laboratories, 2nd Ave. & James St., Seattle, Wash.
 Norton Laboratories, Inc., 520 Mill St., Lockport, N. Y.
 Nussbaum Novelty Co., 269 S. Jefferson, Berne, Ind.

O

Oberly & Newell Lithograph Corp., 545 Pearl St., New York, N. Y.
 Ohio Boxboard Co., The, Rittman, Ohio
 Ohio Plastic Co., The, Frazeyburg, Ohio
 Old Dominion Box Co., 528 Turner Ave., Charlotte, N. C.
 Old Dominion Box Co., Inc., 22 9th St., Lynchburg, Va.
 Olive Can Co., 450 N. Leavitt St., Chicago, Ill.
 Oliver Machinery Co., 1006 Coldbrook St., N. E., Grand Rapids, Mich.
 O'Malley, M. J. Co., Springfield, Mass.
 Oneida Paper Products, Inc., 601 W. 26th St., New York, N. Y.
 O'Neil, William, 11 E. 44th St., New York, N. Y.
 Ontonagon Fibre Corp., Ontonagon, Mich.
 Oris Mfg. Co., Inc., Jackson St., Thomaston, Conn.
 Osborne, Raymond G. Laboratories, Rives-Strong Bldg., Los Angeles, Calif.
 O'Shei, B. F., 170 Florida St., Buffalo, N. Y.
 Oswego River Paper Mills, Phoenix, N. Y.
 Ottawa River Paper Co., The, Matzingar Rd., Toledo, Ohio
 Outserts, Inc., 11 W. 42nd St., New York, N. Y.
 Owens-Illinois Can Co., Ohio Bldg., Toledo, Ohio
 Owens-Illinois Glass Co., Ohio Bldg., Toledo, Ohio
 Owens-Illinois Pacific Coast Co., 1855 Folsom St., San Francisco, Calif.

P

Pacific Can Co., 290 Division St., San Francisco, Calif.
 Pacific Coast Paper Mills, Bellingham, Wash.
 Pacific Diamond H Bag Co., 315 Main St., San Francisco, Calif.
 Pacific Label Co., 407 E. Pico Blvd., Los Angeles, Calif.
 Pacific Printing Ink Co., 416 Jackson St., San Francisco, Calif.
 Package Machinery Co., 132 Birnie Ave., Springfield, Mass.
 Pack-Rite Machine Corp., 828 N. Broadway, Milwaukee, Wis.
 Paisley Products, Inc., 1770 Canalport Ave., Chicago, Ill., 630 W. 51st St., New York, N. Y.
 Palm, Fichtealer & Co., 220 W. 42nd St., New York, N. Y.
 Paper Affiliates Co., Inc., 203 E. 18th St., New York, N. Y.
 Paper Box & Specialty Co., 1505 Sibley Court, Sheboygan, Wis.
 Paper City Mfg. Co., Inc., 624 Hampden St., Holyoke, Mass.
 Paper Converting Machine Co., 601-611 Harvey St., Green Bay, Wis.
 Paper Package Co., 802 S. Delaware St., Indianapolis, Ind.
 Paragon Plastics, Inc., 306 Maritime Bldg., Seattle, Wash.
 Paragon Wood Turning Co., Inc., 431 W. 28th St., New York, N. Y.
 Paramount Paper Products Co., Inc., 1801 Glenwood Ave., Phila., Pa.
 Parfait Powder Puff Co., 1500 N. Ogden Ave., Chicago, Ill.
 Parzinger, Tommi, 310 E. 55th St., New York, N. Y.
 Paslode Co., 2628 N. Artesian Ave., Chicago, Ill.
 Patent Button Co. of Tenn., The, 2221 Century St., Knoxville, Tenn.
 Paterson Parchment Paper Co., Bristol, Pa.
 Pauli, Karl Corp., 454 Broome St., New York, N. Y.
 Paulis, H. Plastics Co., 217 E. Washington Blvd., Los Angeles, Calif.
 Pedersen, H. Mfg. Co., 723 Crocker St., Los Angeles, Calif.
 Peerless Molded Plastics, 410 Hamilton St., Toledo, Ohio
 Peerless Packers, Inc., 175 Pacific St., Bklyn, N. Y.
 Peerless Paper Mills, Inc., Oaks, Pa.
 Peerless Products Mfg. Co., 3338 Joy Rd., Detroit, Mich.
 Peerless Roll Leaf Co., Inc., 4518-4517 New York Ave., Union City, N. J.
 Peerless Tube Co., 58-76 Locust Ave., Bloomfield, N. J.
 Pejeppscot Paper Co., 420 Lexington Ave., New York, N. Y.
 Penn Lithographing Co., 47th & Westminster Ave., Phila., Pa.
 Pennsylvania Glass Products Co., 428-432 N. Craig St., Pittsburgh, Pa.
 Pequannock Valley Paper Co., Butler, N. J.
 Perfect Finishing Co., Inc., 200 Varick St., New York, N. Y.
 Perfection Plastic Products, 900 Passaic Ave., East Newark, N. J.
 Perfumers & Jewelers Box Co., 635 6th Ave., New York, N. Y.
 Peters Machinery Co., 4700 Ravenswood Ave., Chicago, Ill.

Peterson Bros., 165 N. Elizabeth St., Chicago, Ill.
 Pharmacy Paper Box Co., 3401 W. Division St., Chicago, Ill.
 Phelps Can Co., Fulton & Eagle Sts., Baltimore, Md.
 Phenix Associates, 270 Lafayette St., New York, N. Y.
 Philadelphia Can Co., 225 New St., Phila., Pa.
 Philadelphia Carpenter Container Co., Inc., 1823 E. Venango St., Phila., Pa.
 Philadelphia Quartz Co., 126 S. Third St., Phila., Pa.
 Phoenix Metal Cap Co., 2444 W. 16th St., Chicago, Ill.
 Pictorial Paper Package Corp., Aurora, Ill.
 Pie-Pak Co., Inc., 1300 Hudson St., Hoboken, N. J.
 Pilliod Cabinet Co., The, Swanton, Ohio
 Pine-Land Bag Corp., Inc., Pascagoula, Miss.
 Pioneer Paper Box Co., 1417 Washington Ave., S., Minneapolis, Minn.
 Pitkin, Lucius Inc., 47 Fulton St., New York, N. Y.
 Pittsburgh Plastics Corp., 1304 Fifth Ave., New Kensington, Pa.
 Pittsburgh Testing Laboratory, Stevenson St. at Locust, Pittsburgh, Pa.
 Place, Roland P. Co., 410 E. Hines St., Midland, Mich.
 Plano Molding Co., 113 S. Center Ave., Plano, Ill.
 Plaskon Co., Inc., 2112-24 Sylvan Ave., Toledo, Ohio
 Plastal Specialties Co., 3215 Western Ave., Seattle, Wash.
 Plas-Tex Corp., 653 N. Robertson Blvd., Los Angeles, Calif.
 Plastic & Die Cast Products Corp., 1010 E. 62nd St., Los Angeles, Calif.
 Plastic & Rubber Prods. Co., 2100 Hyde Park Blvd., Los Angeles, Calif.
 Plastic Co., Inc., 7457 Melrose Ave., Los Angeles, Calif.
 Plastic Coating Corp., The, Holyoke, Mass.
 Plastic Industries, Inc., 160 Northfield Rd., Bedford, Ohio
 Plastic Inlays, Inc., Summit, N. J.
 Plastic Molded Arts, Inc., 12-04-44th Ave., Long Island City, N. Y.
 Plastic Molding Corp., Sandy Hook, Conn.
 Plastic Moldings Corp., 859 Hathaway St., Cincinnati, Ohio
 Plastic Prods., Inc., 6473 Georgia Ave., Detroit, Mich.
 Plastic Products, Inc., 415 Lexington Ave., New York, N. Y.
 Plastic Research Foundation, 91 Harvard Ave., Brookline, Mass.
 Plastic Turning Co., Inc., Leominster, Mass.
 Plastic-Ware, Inc., 238 William St., New York, N. Y.
 Plasticraft Associates, 155 E. Ohio St., Chicago, Ill.
 Plastics, Inc., 813 Main St., Bradley Beach, N. J.
 Plastics, Inc., 20 E. Chicago Ave., St. Paul, Minn.
 Plastics Engineering Co., 1603 Geale Ave., Sheboygan, Wis.
 Plastics Engineering, Inc., 8506 Lake Ave., Cleveland, Ohio
 Plastics Finishing Corp., 160 John St., Bklyn, N. Y.
 Plastimold, Inc., P. O. Box 628, Attleboro, Mass.
 Platt Corp., 1415 Key Highway, Baltimore, Md.
 Plumly, Eugene K. Co., 1325 Federal St., Phila., Pa.
 Plumly, Geo. W. Co., 417 N. Eighth St., Phila., Pa.
 Pneumatic Scale Corp., Ltd., 77 Newport Ave., North Quincy, Mass.
 Pohl Bros., 2411 E. Franklin St., Richmond, Va.
 Poinsettia, Inc., 98 Cedar Ave., Pitman, N. J.
 Pollock Paper & Box Co., 2236 S. Lamar, Dallas, Texas.
 Pope & Gray, Inc., 95 Morton St., New York, N. Y.
 Port Huron Sulphite & Paper Co., Ft. Washington Ave., Port Huron, Mich.
 Post & Johnson, Inc., 71 Church St., Hartford, Conn.
 Potdevin Machine Co., 1221-38th St., Bklyn, N. Y.
 Potter & Brumfield Mfg. Co., Inc., 615-17 N. Gibson St., Princeton, Ind.
 Precision Molded Plastics, Inc., 2014 W. 53rd St., Cleveland, Ohio
 Precision Plastics Co., 1724 W. Indiana Ave., Phila., Pa.
 Premier Bag Co., Inc., Newark & Bage Aves., Lyndhurst, N. J.
 Prentiss, George W. & Co., 439 Dwight St., Holyoke, Mass.
 Prescott, J. L. Co., Passaic, N. J.
 Price, M. B. Associates, 3301 Empire State Bldg., New York, N. Y.
 Print-A-Tube Co., 44 Lexington Ave., Passaic, N. J.
 Printloid, Inc., 93 Mercer St., New York, N. Y.
 Producers Dealers Supply Co., Market & Front Sts., Boston, Mass.
 Progress Lithographing Co., The, Reading, Cincinnati, Ohio
 Progressive Bag Co., Inc., New Haven, Conn.
 Pro-phy-lac-tic Brush Co., Pine St., Florence, Mass.
 Protective Coatings, Inc., P. O. Box 56, Strathmoor Station, Detroit, Mich.
 Pulp Reproduction Co., 3000 W. Clarke St., Milwaukee, Wis.
 Purepac Corp., 511 E. 72nd St., New York, N. Y.
 Pyro Plastics Co., The, 526 North Ave., Westfield, N. J.
 Pyrotex Leather Co., 287 Whitney St., Leominster, Mass.
 Pyroxylin Products, Inc., 4851 S. St. Louis Ave., Chicago, Ill.

Quality Park Box Co., 450 N. Syndicate St., St. Paul, Minn.
 Queen City Paper Co., The, Akron, Ohio
 Quincy Paper Box Co., 230 N. Third St., Quincy, Ill.
 Quinn, Don L. Co., 609 N. LaSalle St., Chicago, Ill.
R
 R. C. Can Co., 121 Chambers St., St. Louis, Mo.
 Racine Universal Motor Co., 1637 Gould St., Racine, Wis.
 Racquette River Paper Co., The, Potsdam, N. Y.
 Randolph Box & Label Co., 843 W. Van Buren St., Chicago, Ill.
 Randolph Paper Box Co., 1313 E. Grace St., Richmond, Va.
 Rapids-Standard Co., Inc., The, 535 Bond Ave., N. W., Grand Rapids, Mich.
 Rathbun Molding Corp., 290 Rochester St., Salamanca, N. Y.
 Raymond Bag Co., 1937 Jackson Blvd., Middletown, Ohio
 Raymond Laboratories, Inc., 261 E. 5th St., St. Paul, Minn.
 Read, Robert E. Inc., Dexter, N. Y.
 Recto Molded Products, Inc., Appleton & B. & O. R.R., Cincinnati, Ohio
 Redington, F. B. Co., 112-114 S. Sangamon St., Chicago, Ill.
 Reed Container Sales Corp., 522 Fifth Ave., New York, N. Y.
 Reed Tissues Corp., Little Falls, N. Y.
 Reeves Pulley Co., Columbus, Ind.
 Reilly Tar & Chemical Corp., P. O. Box 125, Indianapolis, Ind.
 Reinhold, F. E. Co., 7001 McKinley Ave., Los Angeles, Calif.
 Remler Co., Ltd., 2101 Bryant St., San Francisco, Calif.
 Republic Paperboard Co., The, 3347 Madison Rd., Cincinnati, Ohio
 Republic Steel Corp., Republic Bldg., Cleveland, Ohio
 Resina Automatic Machinery Co., Inc., 125 Wolcott St., Bklyn, N. Y.
 Resinous Products & Chemical Co., The, 222 W. Washington Sq., Phila., Pa.
 Resistoflex Corp., Belleville, N. J.
 Resinger, Paul, 8 S. Michigan Ave., Chicago, Ill.
 Rexford Paper Co., 1715 W. Canal St., Milwaukee, Wis.
 Reyburn Mfg. Co., Inc., The, Allegheny Ave. at 32nd St., Phila., Pa.
 Reynolds Metals Co., 810 E. Franklin St., Richmond, Va.
 Reynolds Spring Co., Molded Plastics Div., Cambridge, Ohio
 Rhineland Paper Co., Rhineland, Wis.
 Richard Machine Co., 31 South Place, Battle Creek, Mich.
 Richardson Co., The, Melrose Park, Chicago, Ill.
 Richardson Taylor-Globe Corp., 4501 Mitchell Ave., Cincinnati, Ohio
 Riegel Paper Corp., 342 Madison Ave., New York, N. Y.
 Rinkle Krinkle Paper Co., 326 A St., Boston, Mass.
 Ritchie, W. C. & Co., 8855 S. Baltimore Ave., Chicago, Ill.
 River Valley Tissue Mills, Inc., Phoenix, N. Y.
 Roberts, Lewis Inc., 72 Union St., Newark, N. J.
 Robertson Co., The, Hinsdale, N. H.
 Robertson Can Co., Springfield, Ohio
 Robertson, G. E. & Co., Hinsdale, N. H.
 Robertson Paper Box Co., Inc., Montville, Conn.
 Robinson, A. E. & Co., 605 W. Washington St., Chicago, Ill.
 Robinson Clay-Product Co., 101 Park Ave., New York, N. Y.
 Robinson-Spear Corp., 345 W. 40th St., New York, N. Y.
 Robinson Tag & Label Co., 460 W. 34th St., New York, N. Y.
 Rochester Folding Box Co., P. O. Box 1012, Rochester, N. Y.
 Rock City Paper Box Co., Inc., 800-12th Ave., N., Nashville, Tenn.
 Rockford Fibre Container Co., Rockford, Ill.
 Rode & Brand, 200 William St., New York, N. Y.
 Rogan Bros., 180 N. Wacker Dr., Chicago, Ill.
 Rogers, Edward H. Inc., 292 Avenue B, New York, N. Y.
 Rogers, V. F., 2454 15th St., Denver, Colo.
 Rohm & Haas Co., Inc., 222 W. Washington Sq., Phila., Pa.
 Rondout Paper Mills, Inc., Napanoch, N. Y.
 Roosen, H. D. Ink Co., 78 Twentieth St., Bklyn, N. Y.
 Rossotti Lithographing Co., Inc., 8511 Tonnelle Ave., N. Bergen, N. J.
 Rotogravure Div., General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.
 Rotogravure Engineering Co., 299 Marginal St., E. Boston, Mass.
 Rowell, E. N. Co., Inc., Batavia, N. Y.
 Royal Moulding Co., 69 Gordon Ave., Providence, R. I.
 Royal Paper Corp., 210 Eleventh Ave., New York, N. Y.
 Royal Paper Box Co., 1136 S. Los Angeles St., Los Angeles, Calif.
 Royal, Thomas M. & Co., 5800 N. Seventh St., Phila., Pa.

Rubin, Jos. & Sons, Inc., 35 Meserole Ave., Bklyn, N. Y.
 Ruckelshaus & Co., Inc., 545 Fifth Ave., New York, N. Y.
 Rudnick, A. & A. Inc., 342 W. 14th St., New York, N. Y.
 Rushmore Paper Mills, Inc., Natural Dam, N. Y.
 Russell Products Co., Harrison Bldg., Phila., Pa.
 Rutherford Machinery Co., Div. General Printing Ink Corp., 100 Sixth Ave., New York, N. Y.
S
 Sacramento Bag Mfg. Co., 810 Second St., Sacramento, Calif.
 Saffy Socket Co., 306 S. State St., Gibson City, Ill.
 Safeway Products Corp., 34 Union Square, New York, N. Y.
 St. Louis Plastic Moulding Co., 3515 N. Florissant, St. Louis, Mo.
 St. Louis Sticker Co., 1906 Pine St., St. Louis, Mo.
 St. Regis Paper Co., 230 Park Ave., New York, N. Y.
 Salisbury Mfg. Co., 501 Roosevelt Ave., Central Falls, R. I.
 Salwen, Joe Paper Co., 405 E. 4th St., New York, N. Y.
 Salz Bros., Inc., 44 W. 28th St., New York, N. Y.
 Sample-Durick Co., Foot of Myrtle St., Indian Orchard, Mass.
 Sanderson Products, Inc., 48 W. 48th St., New York, N. Y.
 Sanitary Paper Mills, Inc., East Hartford, Conn.
 Saranac Machine Co., 376 W. Main, Benton Harbor, Mich.
 Say-Way Industries, 4875 E. Eight Mill, Detroit, Mich.
 Scandia Mfg. Co., N. Arlington, N. J.
 Scandore Paper Box Co., Steuben St. & Park Ave., Bklyn, N. Y.
 Scheele, Edwin H., 419-4th Ave., New York, N. Y.
 Schleicher, F. J. Paper Box Co., 1811 Chouteau St., St. Louis, Mo.
 Schmeer's Paper Box Co., Inc., 204 Herald Place, Syracuse, N. Y.
 Schmidt & Ault Paper, 423 King's Mill Rd., York, Pa.
 Schmidt, Henry & Bro., Inc., 328 Vine St., Phila., Pa.
 Schmidt Lithograph Co., 461-2nd St., San Francisco, Calif.
 Schmidt Bros. Co., 912 Brown St., Phila., Pa.
 Schneider Bros. Co., 912 Brown St., Phila., Pa.
 Schoettle, Edwin J. Co., 533 N. 11th St., Phila., Pa.
 Schorsch & Co., Inc., 505 E. 133rd St., New York, N. Y.
 Schultz Folding Box Co., Eleventh & Pestalozzi, St. Louis, Mo.
 Schulz, A. Geo. Co., 433 W. Clybourn St., Milwaukee, Wis.
 Schunak, C. E. Inc., 470 Center St., Meriden, Conn.
 Schurmman, F. A. Inc., 449 Troutman St., Bklyn, N. Y.
 Schusterman, William V., 499 Lincoln Pl., Bklyn, N. Y.
 Schutz, Thomas A. Co., 201 N. Wells St., Chicago, Ill.
 Schutze Bros., 152 Chambers St., New York, N. Y.
 Schwab & Frank, Inc., 243 W. Congress, Detroit, Mich.
 Schwarm & Jacobus Co., 1216 Jackson St., P. O. Box 35, Sta. V., Cincinnati, Ohio
 Schwerdtle Stamp Co., 9 Cannon St., Bridgeport, Conn.
 Scientific Filter Co., 4 Franklin Square, New York, N. Y.
 Scott & McDonald, Inc., 45 Williams St., Everett, Mass.
 Scott, Geo. S. Mfg. Co., The, W. Main St., Plantsville, Conn.
 Seavill Mfg. Co., 99 Mill St., Waterbury, Conn.
 Seal, Inc., 8 Brook, Shelton, Conn.
 Seairlight Co., Inc., S. First St., Fulton, N. Y.
 Seaman Box Co., Inc., 29 Ninth Ave., New York, N. Y.
 Sears, Merle Paper Box Co., Danville, Ill.
 Security Bag Co., The, Lock & Cooper Sts., (Lockland), Cincinnati, Ohio
 Seder & Son Molded Products Co., 324 S. Meldrum St., Fort Collins, Colo.
 Sealey Tube & Box Co., 170 Thomas St., Newark, N. J.
 Sefton Fibre Can Co., 3275 Big Bend Blvd., Maplewood, St. Louis, Mo.
 Seinsheimer Paper Corp., Colerain, Alfred & Cook Sts., Cincinnati, Ohio
 Self-Locking Carton Co., 589 E. Illinois St., Chicago, Ill.
 Senoso Paper Co., Inc., Phoenix, N. Y.
 Service Paper Box Co., 309 N. 3rd St., St. Louis, Mo.
 Sexton Can Co., Inc., 31 Cross St., Everett, Mass.
 Seymour & Peck Co., 917 W. 30th Pl., Chicago, Ill.
 Seymour Products Co., The, Seymour, Conn.
 Seymour & Co., 101 S. Wells St., Chicago, Ill.
 Shampain, Citron, Clark, Inc., 43 York St., Bklyn, N. Y.
 Shaw Insulator Co., 150 Coit St., Irvington, N. J.
 Shaw Paper Box Co., Charles St., Meriden, Conn.
 Shaw Paper Box Co., 37 Sabin St., Pawtucket, R. I.
 Shawmut Waxed Paper Co., Holliston, Mass.
 Shawprint, Inc., Lowell, Mass.
 Shellar Mfg. Corp., S. Bridge, Portland, Ind.
 Shellmar Products Co., Mt. Vernon, Ohio
 Shepherd, J. H. Son & Co., 1820 East Ave., Elyria, Ohio

Sherman Paper Products Corp., 156 Oak St., New-Upper Falls, Mass.
Shomer-Majestic Box Corp., 510 Fifth Ave., New York, N. Y.
Shoup-Owens, Inc., 1100 Adams St., Hoboken, N. J.
Shuman, Frank G. Co., The, 600 W. Jackson Blvd., Chicago, Ill.
Shuttleworth Carton Co., Inc., 474 W. Broadway, New York, N. Y.
Siebold, J. H. & G. B. Inc., 47 Watts St., New York, N. Y.
Siegel, A. L. Co., Inc., 274 Lafayette St., Newark, N. J.
Signode Steel Strapping Co., 2600 N. Western Ave., Chicago, Ill.
Sillocks-Miller Co., The, 10 Parker Ave., W., South Orange, N. J.
Simco Co., The, 4929 York Rd., Phila., Pa.
Simplex Paper Box Corp., Janet Ave., Lancaster, Pa.
Simplex Textured Reproductions, Inc., 225 Varick St., New York, N. Y.
Simplex Wrapping Machine Co., 615 23rd Ave., Oakland, Calif.
Sinclair & Carroll Co., 591 Eleventh Ave., New York, N. Y.
Sinclair & Valentine Co., 611 W. 129th St., New York, N. Y.
Single Service Containers, Inc., 205 E. 42nd St., New York, N. Y.
Sinko Tool & Mfg. Co., 351 N. Crawford Ave., Chicago, Ill.
Siskraft Co., 205 W. Wacker Drive, Chicago, Ill.
Slight Metallic Ink Co., 538 N. Third St., Phila., Pa.
Sleight Metallic Ink Co. of Ill., 717 W. Congress St., Chicago, Ill.
Slichter Box Co., Inc., 126 S. Church St., Mohnton, Pa.
Smeall & Voorhees, Inc., Amsterdam, N. Y.
Smith, H. P. Paper Co., 5001 W. 66th St., Chicago, Ill.
Smith, S. K. Co., The, 2857 N. Western Ave., Chicago, Ill.
Smith-Emery Co., 920 Santee St., Los Angeles, Calif.
Smith-Emory & Co., 651 Howard St., San Francisco, Calif.
Smith-Lustig Paper Box Mfg. Co., The, 2165 E. 31st St., Cleveland, Ohio
Smith & Winchester Mfg. Co., The, S. Windham, Conn.
Smith Paper, Inc., Lee, Mass.
Smith, F. L. Machine Co., Inc., 645 W. 44th St., New York, N. Y.
Snyder, Geo. H. Inc., 3631 N. Smedley St., Phila., Pa.
Sobenite, Inc., 1344 W. Sample St., South Bend, Ind.
Sonoco Products Co., Hartsville, S. C.
Southern California Bag Co., 1328 Santa Fe Ave., Los Angeles, Calif.
Southern Kraft Div. International Paper Co., 220 E. 42nd St., New York, N. Y.
Southern Paper Co., Ltd., 635 Tchoupitoulas St., New Orleans, La.
Southern Plastics Co., 906-08 Main St., Columbia, S. C.
Southern States Bag Co., Jacksonville, Fla.
Southern Waxed Paper Co., 840 Woodrow Ave., S. W., Atlanta, Ga.
Southwest Machine & Plastic Co., 5419 McKinley Ave., Los Angeles, Calif.
Spaulding China Co., Inc., Sebring, Ohio
Specialty Insulation Mfg. Co., Inc., 55 Center St., Hoosick Falls, N. Y.
Specialty Paper Box Co., 255 McKibben St., Bklyn, N. Y.
Specialty Papers Co., The, 802 Miami Chapel Rd., Dayton, Ohio
Speedway Mfg. Co., 1834 S. 52nd Ave., Cicero, Ill.
Springfield Coated Paper Corp., 9th & Bailey Sts., Camden, N. J.
Sprosty, Dan A. Bag Co., 900 S. Lakewood Ave., Baltimore, Md.
Spehler, Ernst A., 540 N. Michigan Ave., Chicago, Ill.
Standard Can Co., 2655 W. Van Buren St., Chicago, Ill.
Standard Cap & Molding Co., Inc., 307 S. Eaton St., Baltimore, Md.
Standard Conveyor Co., 315 N. W. 2nd, N. St. Paul, Minn.
Standard-Knapp Corp., Portland, Conn.
Standard Molding Co., Baltimore, Md.
Standard Novelty Box Co., 385 Girard Ave., New York, N. Y.
Standard Paper Box Co., 426 Cass Ave., Detroit, Mich.
Standard Paper Box Corp., 3837 S. Broadway Place, Los Angeles, Calif.
Standard Plastics Co., 62 Water St., Attleboro, Mass.
Standard Products Co., The, Thermo-Plastics Div., 505 Boulevard Bldg., Detroit, Mich.
Standard Specialty & Tube Co., Lower Penn Ave., New Brighton, Pa.
Stanley Works, The, Lake St., New Britain, Conn.
Star Case Co., The, 76 Madison Ave., New York, N. Y.
Stark Bros. Ribbon Corp., 352 Fourth Ave., New York, N. Y.
Stauder, E. G. Mfg. Co., 2675 University Ave., St. Paul, Minn.
Stecher-Traung Lithograph Corp., 274 N. Goodman St., Rochester, N. Y.; 600 Battery St., San Francisco, Calif.

Stecker Paper Box Co., 1420 W. 4th St., Detroit, Mich.
Steel & Tin Products Co., Inc., President & Faun Sts., Baltimore, Md.
Stein, A. & Co., 1143 W. Congress St., Chicago, Ill.
Stein, Hal Mfg. Co., 2841 S. Ashland Ave., Chicago, Ill.
Stensgaard, W. L. & Associates, 346 N. Justine St., Chicago, Ill.
Sterling Bag Co., 11 Green Lane, Bklyn, N. Y.
Sterling Injection Molding, Inc., 277 Military Rd., Buffalo, N. Y.
Sterling Plastics Co., 1140 Commerce Ave., Union, N. J.
Sterling Seal Co., Erie, Pa.
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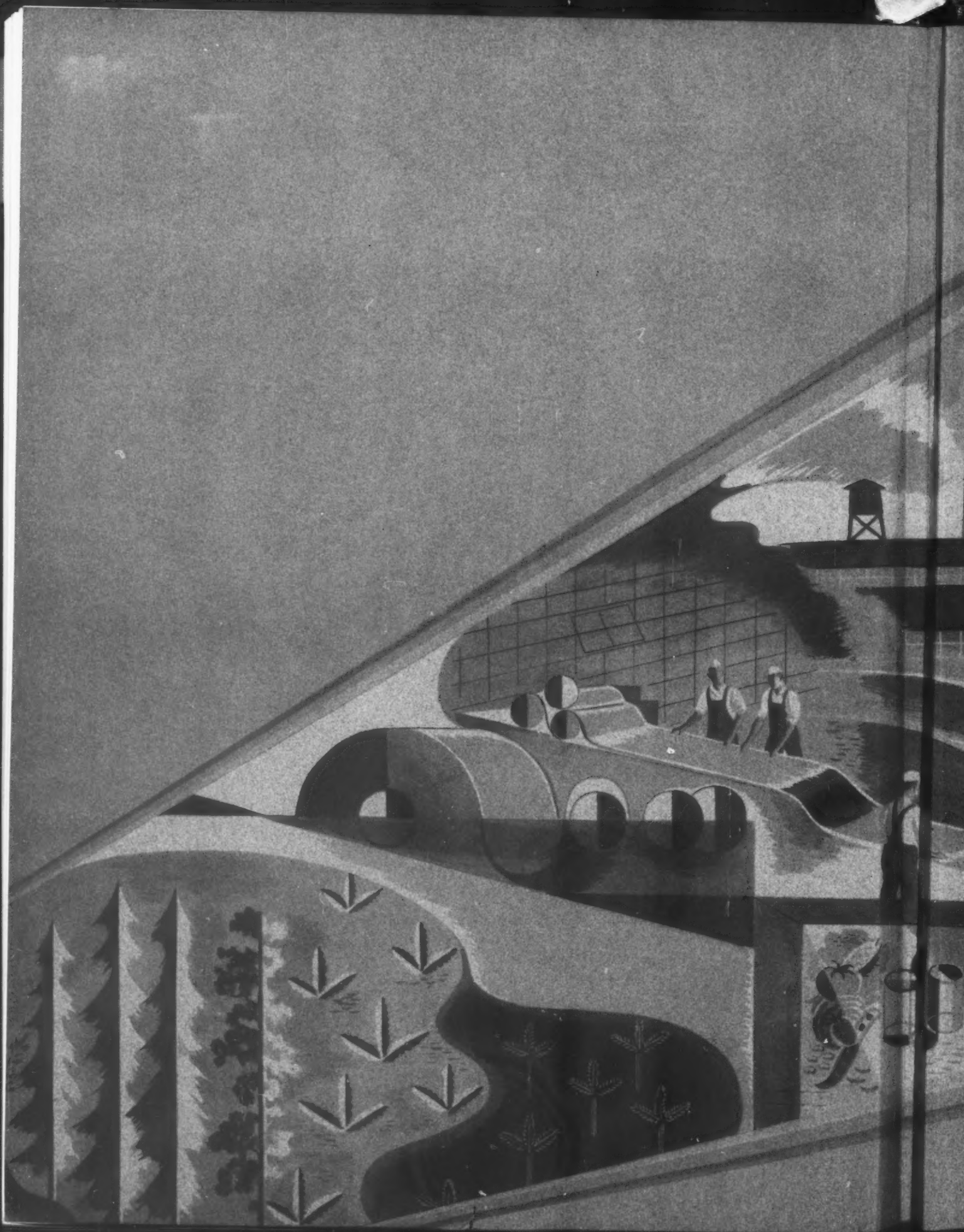
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